THE EMPIRICAL IMPORTANCE OF

PRECAUTIONARY SAVING IN TURKEY

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Abstract

The aim of this Ph.D. thesis is to contribute to the understanding of household consumption and saving behaviour under risk and uncertainty. The precautionary saving hypothesis proposes that households will postpone their consumption and increase their saving level to be protected against future labour income uncertainty. It is reasonable to interpret the additional rise in household saving due to future labour income uncertainty as precautionary saving. Moreover, it is expected that households will prefer to keep their precautionary saving in the form of financial assets because of their liquidity.

I utilize several waves of household budget surveys, which are designed as repeated cross-sectional surveys that provide information about social, economic and demographic characteristics of households to reveal the empirical importance of precautionary saving in the Turkish economy. The empirical analysis confirms the predictions of the precautionary saving hypothesis. It is observed that households raise their saving level under risk and uncertainty and the amount of precautionary saving constitutes a significant fraction of total household saving. Labour income risk is the most important source of concern for households among the analysed risk types, since a job-opportunity in the registered economy creates a reliable source of income and social security coverage. Moreover, households implement alternative strategies

in addition to precautionary saving such as holding a second job and to increase the number income earners in the family.

The influence of risk and uncertainty on household consumption and saving behaviour is further intensified by the lack of a sufficient social security system, which meets the needs and the demands of society. However, a comprehensive social security reform starting with the introduction of universal health care is being implemented in Turkey. Thus, it is thought that the improvement of the social security system will diminish the significance of the precautionary motive for saving for households.

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LIST OF ABBREVIATIONS

Bank of Italy Survey of Household Income and Wealth	SHIW
British Household Panel Survey	BHPS
Central Bank of the Republic of Turkey	CBRT
Consumer Expenditure Survey	CEX
Consumer Price Inflation	CPI
Current Population Survey	CPS
European Union	EU
Foreign Direct Investment	FDI
Generalised Method of Moments	GMM
Gross Domestic Product	GDP
Health and Retirement Survey	HRS
Household Budget Survey	HBS
Instrumental Variables	IV
International Monetary Fund	IMF
İstanbul Stock Exchange Market	ISE
Marginal Propensity to Consume	MPC
National Health Service	NHS
Ordinary Least Squares	OLS
Panel Study of Income Dynamics	PSID
Public Sector Borrowing Requirement Rate	PSBR

Russian Longitudinal Monitoring Survey	RSLM
South-east Anatolia Project	GAP
State Institute of Statistics of the Republic of Turkey	TURKSTAT
State Planning Organisation of the Republic of Turkey	SPO
Survey of Consumer Finances	SCF
Two-stage Least Squares	2SLS
Two-stage Probit Least Squares	2SPLS
Urban Household Income, Expenditure and Employment	UHIEE
World Bank	WB

Chapter I

Introduction

I.1 – Motivation

It is interesting to try to understand human beings' ways of economic thinking in modern societies. However, it is possible to realise this aim only if the approach of economic theory is based on the individual's perspective. Thus, the development of a microeconomic theory based on individual choices and preferences is essential for understanding of household consumption and saving behaviour.

Although, the individual is the focus of the analysis, it is also necessary to acknowledge the fact that the family is the most important aspect of life for many individuals. Moreover, age, gender, education level, occupation, employment status and employment sector are significant features that influence the individual decision-making processes. Thus, social and demographic factors have to be incorporated into the theory of individual choices and preferences along with economic variables.

At the same time, there are many different types and definitions of risk in the economic and social environment, which might influence household consumption and saving behaviour. Each one of these risk categories can play an important role in the

daily lives of households from all over the world. Therefore, it is essential to consider the presence and the influence of different risk categories in the empirical analysis for a better understanding of household consumption and saving behaviour.

The impact of risk on household saving decisions is further intensified in developing countries (Deaton, 1989). The main issue is the fact that the social security system is not satisfactory to meet the needs and demands of society in developing countries. In addition to that, financial markets do not provide support for households by extending credit in times of emergency due to imperfect information and limited financial resources. Hence, liquidity constraints are another important source of concern for households in developing countries. Finally, future income prospects are much more exposed to risk in developing countries due to the substantial size of the agricultural sector in both national income and employment.

The precautionary saving hypothesis proposes that households accumulate financial assets to protect themselves against different types of uncertainty such as labour income risk and health risk. From a theoretical point of view, it is claimed that households postpone their consumption expenditures and raise their saving level in the current period, if their future income is exposed to risk and it is not possible to predict or insure the risk factor in advance. In this framework, *precautionary saving* is defined as the additional amount of saving that households hold against future labour income uncertainty. At this point, it is necessary to emphasise the difference between life cycle saving and precautionary saving. An appropriate motivation for life-cycle saving can be financing consumption during the retirement period, but precautionary saving is realised to safeguard against an unanticipated negative income shock such as a spell of unemployment. Thus, households might prefer to keep a certain part of wealth in financial assets because of their liquidity.

The fundamental aim of this Ph.D. thesis is to explore the empirical importance of precautionary saving in Turkey. The case of Turkey presents a unique opportunity to investigate the relevance of the precautionary saving hypothesis within the context of a developing country. I will utilise the Household Budget Surveys for 2003 and 2004 prepared by the Institute of Statistics of the Republic of Turkey (TURKSTAT) in order to achieve this aim.

I.2 – Recent Macroeconomic Performance of the Turkish Economy

The Republic of Turkey was founded in 1923 mainly in Anatolia, including a small piece of land in the Eastern Thrace (Balkan region).[1] The official language of the country is Turkish and the capital city is Ankara. However, the most important city is Istanbul, which is the cultural and business centre of the country. Turkey has a population of around 70 million people and its land size is 814,578 square kilometres. Thus, Turkey is more populous and larger in size than many European countries. Moreover, the Gross Domestic Product (GDP) of the country was $655.9 US billion dollars in 2007, while GDP per capita was around $9,305 US dollars in the same year. International economic institutions such as the World Bank (WB) and International Monetary Fund (IMF) predict that Turkey will continue to realise high growth rates well above developed country averages – albeit the current global economic crisis might slowdown economic growth for the next few years. The Turkish economy is already one of the twenty biggest economies in the world and, will probably find itself in a higher position in the years to come.

[1] See http://www.discoverturkey.com/ for information about the Republic of Turkey.

Turkey is often categorised as an emerging market economy not only because of the size of the economy, but also the exposure of the economy to the international financial markets. The foreign trade regime was completely liberalised in 1982 as part of a series of economic reforms to transform the country to an open market economy. Subsequently, the capital account was liberalised in 1989 and the restrictions on the free movement of financial capital were abolished, which changed the structure of the domestic financial markets completely. The opening of the Istanbul Stock Exchange Market (ISE), where the shares of the largest private and public companies are traded, in 1986 is another milestone for the Turkish economy. Moreover, Turkey signed the Customs Union Agreement with the European Union (EU) in 1996, which eliminated tax and tariff barriers in the goods market, except for agricultural products. However, the implementation of the structural reform process is still a major discussion topic among economists in Turkey (Rodrik, 1991).

Unfortunately, Turkey could not fully enjoy the benefits of becoming a liberal and open market economy like many other developing countries. On the contrary, the Turkish economy suffered from political instability and macroeconomic uncertainties during this period of change and transformation. Moreover, the country witnessed serious financial and economic crises in the past two decades. Especially, high and chronic inflation period had a devastating effect on the economy as well as household wealth. The deterioration of the public finance worsened the social security system, which was not sufficient to meet the needs of society. It is reasonable to assert that household consumption and saving behaviour was negatively influenced during these turbulent years. The deterioration of household finances, the worsening of the social security system and the rise in future labour income uncertainties due to the economic crises might have disturbed household consumption and saving behaviour. Therefore,

it is necessary to be cautious in the analysis of Turkish households' consumption and saving decisions during this period.

Recent macroeconomic policies and structural reforms aim to transform the country into an efficient and productive economy in order to create a better future for the entire society. Moreover, the primary aim of Turkey is to become a full member of the EU. Turkey started negotiation talks with the EU in October 2005 in order to secure a full membership position. The accession to the EU is evaluated as the most significant of part of a wider civilisation process. In order to achieve this aim, Turkey is trying to improve all aspects of its economy with the supervision of international economic institutions such as the WB and the IMF to attain the EU standards.

Turkey is currently implementing an ambitious stabilisation program, whose main purpose is to overcome the high and chronic inflation problem of the country and to reach price stability at single-digit inflation levels. The stabilisation program is designed to restore confidence in the financial markets and to improve the economic agents' expectations about the future course of the economy. As a result, the real interest rates will fall due to the reduction of the risk premium of the economy, which will lower the burden on the public finances and also stimulate domestic demand and economic growth. Hence, the successful implementation of the stabilisation program will decrease the Consumer Price Inflation (CPI) to single-digit levels and help to maintain price stability in the future as well.

The greatest challenge of the stabilisation program is the high domestic debt stock of the public sector. For this reason, *fiscal discipline* should be the essence of the stabilisation program. In this framework, the government aims to realise a primary surplus in the public sector consolidated budget as a significant ratio of the GDP. The fall in the public sector borrowing requirement rate (PSBR) will decrease the public

sector's demand for financial resources, which will contribute to the fall in the real interest rates. At the same time, an ambitious privatisation policy is being implemented to eliminate the sources of the public sector consolidated budget deficit and to raise the productivity and the competitiveness levels of the economy.

The law of the Central Bank of the Republic of Turkey (CBRT) was amended in 2001, which today clearly indicates that the ultimate goal of the CBRT is to provide price stability in the economy. However, the CBRT might support economic growth and employment policies of the government provided that they do not conflict with the announced inflation target. The main reason of this legal change is to lay the foundations of an independent Central Bank in an attempt to gain credibility in the financial markets. Moreover, the CBRT announced that it would start to implement an Inflation Targeting Monetary Policy in 2006.[2]

The inflation-targeting framework became a success for the Turkish economy. The expectations of economic agents improved significantly and eventually, the CPI fell to single-digit levels in 2004 and followed a horizontal trend afterwards. Annual consumer price inflation was realised at 8.4 % in 2007. However, the global rise in the price levels due to the pressure coming from production costs such as oil and electricity prices made it difficult to decrease the inflation rate even further.

Economic agents are optimistic about the future course of the country, because Turkey's hopes for joining the EU became a real possibility for the first time. It is thought that these positive economic and political developments will accelerate the Foreign Direct Investment (FDI) towards Turkey. According to the statistics provided by the Undersecretary of the Treasury, the FDI in Turkey remained low, averaging $1

[2] See the official web site of the Central Bank http://www.tcmb.gov.tr/ for more information.

U.S. billion dollars annually until 2004, but it started to rise significantly afterwards. It is thought that economic and judicial reforms and prospective EU membership raised the flow of FDI to Turkey. The predictions of the public institutions such as the State Planning Organisation (SPO) and the Undersecretary of the Treasury proved correct and the total amount of FDI was realised as $19.9 U.S. billion dollars in 2006, which became $21.9 U.S. billion dollars in 2007. The positive trend in the FDI flows is expected to continue in the next years, but the slowdown in the global economy and the liquidity crunch might affect the situation of all developing countries.

Moreover, Turkey is implementing various regional projects to facilitate its social and economic development. The South-east Anatolia Project (GAP) is the most interesting and promising one among them.[3] This project is a collection of many optimistic ideas for the future of the region, which aim to create greater cultural exchanges and to establish social and economic links with the rest of the country. Special emphasis is placed upon the improvement of agricultural production and the rise in tourism revenues for the region.

The project area consists of 9 provinces (Adıyaman, Batman, Diyarbakır, Gaziantep, Kilis, Mardin, Siirt, Şanlıurfa, Şırnak) from the South-east Anatolia region of the country. Geographically, it is the fertile land between the Euphrates and Tigris rivers in Turkey, which is also called as the Upper Mesopotamia region. However, the water resources of the region are not being utilised efficiently and as a result of that agricultural production falls behind its potential level. The construction of irrigation canals to raise the agricultural production level is one of the primary aims of the GAP project.

[3] See http://www.gap.gov.tr/gap_en.php for information about the South-east Anatolia Project (GAP).

It is often said that the project is almost at the same age as the Republic of Turkey. The original idea of building a dam and a hydroelectric power plant on the Tigris River was first suggested in the 1930s. This idea was developed into a feasible and inclusive plan for the entire South-east Anatolia region in the 1970s. Initially, GAP started as a regional development project at the beginning of 1980s, which included the construction of huge dams, hydroelectric power plants and irrigation canals. However, in time it became clear that the project is more sophisticated than initially thought, which required the preparation of a comprehensive plan. Thus, a master plan was developed by the GAP project administration in the 1990s, which was later revised in 2002.

Today, GAP is understood as a sustainable human development project, which is concentrated on human needs such as the improvement of income distribution and the creation of employment opportunities, the conservation of the natural environment and the historical heritage of the region.

There are four main aims of the GAP project:

1. To establish a modern management system of water and land resources for irrigation and urban and industrial development purposes.
2. To improve land management by implementing more productive and efficient agricultural techniques.
3. To promote manufacturing industry sectors, which are linked to agricultural production and rely on regional resources.
4. To improve social services and urban infrastructure to satisfy the needs of local people and to attract and keep qualified individuals in the region.

According to the master plan, the South-eastern Anatolia region will have an export-oriented economy mainly based on agricultural goods. At the same time, businessmen hope that the region will attract more domestic and foreign tourists, which will contribute to the local economy. The living-standards of all people both from the region and the rest of the country will improve with the completion of the project. It is thought that everyone in the country will share the benefits of regional economic and social development.

It is estimated that the total cost of the project will reach $32 U.S. billion dollars, when it is finally completed. Moreover, it is calculated that $18.3 U.S. billion dollars are already invested in the project until 2007 since its start. The project was supposed to be finished by the end of 2005, but it is estimated that it will be finished by 2010 according to the new master plan. The water resources program includes the construction of 22 dams and 19 hydroelectric power plants and irrigation canals for 1.82 million hectare land. With the completion of the project, 28 % of the water resources of the country will be taken under control. It is estimated that the production capacity of the power plants will be above 7,476 megawatt, which is 18.4 % of total production capacity of the country with 2006 figures.

Consequently, the Turkish economy realised a swift and strong recovery after the economic crisis in 2001. The average GDP growth rate was 7.2 % between 2002 and 2006 and the GDP growth rate became 4.6 % in 2007 compared to the previous year. The growth of the economy is expected to continue in the next years, but the growth rates might decline, partly as a result of the slowdown in the global economy.

Today, the Turkish economy is a mixture of industry and service sectors, together with a traditional but changing agricultural sector. The public sector still plays an important role in the manufacturing industry, which specialises in the

production of raw materials and intermediate goods. However, the private sector is growing strongly and the improvement of the export performance of the economy depends on the production of manufacturing goods by private firms. The largest industrial sectors are the automotive and the textiles and clothing, which face intense competition in the international markets coming from developing countries such as China, especially with the end of the global quota system. The significance of the durable goods and electronics industries in the industrial production and export performance is rising fast in Turkey.

I.3 – Summary

The empirical analysis presented in this thesis confirms the propositions of the precautionary saving hypothesis. Household savings decisions are significantly influenced by the presence of different types of risk categories in addition to social and demographic variables in Turkey. It is observed that households postpone their consumption expenditures and raise their saving level to protect themselves against different categories of income risk as well as health expenditures risk.

Moreover, the empirical analysis suggests that households implement alternative strategies to cope with the rising level of risk in the economy. The two most important ways selected by households are to increase the number of income earners in the family and holding a second job to support the family. Household behaviour suggests that income smoothing can be a more feasible alternative to precautionary saving for consumption smoothing for developing countries.

The outline of the Ph.D. thesis is as follows:

i) Chapter II will discuss Modern Consumer Theory from a critical point of view and establish a link with the precautionary saving hypothesis.

ii) Chapter III will provide a comprehensive literature survey on household consumption and saving behaviour with special emphasis given to the empirical research on liquidity constraints and the precautionary saving hypothesis.

iii) Chapter IV will analyse the impact of labour income risk on household saving decisions in Turkey.

iv) Chapter V will explore the role of the entrepreneurial class in the formation of precautionary saving in Turkey.

v) Chapter VI will analyse the impact of health expenditures risk on household saving decisions in Turkey.

vi) Chapter VII will conclude the Ph.D. thesis with a brief discussion on empirical research and comment on directions for future research.

Chapter II

Modern Consumer Theory

II.1 – Introduction

Modern Consumer Theory provides an excellent illustration of the development of knowledge in economics. In this respect, the aim of this chapter is to discuss Modern Consumer Theory from a critical point of view. The discussion will help to establish the link between Modern Consumer Theory and the precautionary saving hypothesis.

Keynes (1936) is largely credited for the creation of the field of modern macroeconomics. He defined the principles of the Keynesian theory of consumption in his seminal study, *The General Theory of Employment, Interest and Money* (1936), which inspired further theoretical and empirical research. The principles of the Keynesian theory of consumption are concerned with the relationship between aggregate income and aggregate consumption expenditures. His approach to the aggregate consumption function can be better understood with a direct quotation from The General Theory of Employment, Interest and Money (1936): “The fundamental psychological law, upon which we are entitled to depend with great confidence both a

priori from our knowledge of human nature and from the detailed facts of experience, is that men are disposed, as a rule and on the average, to increase their consumption as their income increases, but not by as much as the increase in their income.[4]" It is observed from this passage that there is an emphasis on human psychology as well as the fundamental economic principles.

In this respect, the main principles of the Keynesian theory of consumption are outlined as follows:

- Consumption is a fairly stable function of current income and the marginal propensity to consume (MPC) out of current income is high.
- The MPC out of current income falls as current income continues to increase.
- Consumption will remain stable over time even if current income increases significantly, since individual tastes and preferences for consumption do not change swiftly.

Subsequent empirical research clearly indicates that the MPC out of current income is not as high as predicted by Keynes. At the same time, the saving rate remains roughly the same despite the increase in income in time in the U.S. economy (Kuznets, 1946). Moreover, the levels of consumption among different social and demographic groups might vary significantly, but their MPC ratios are actually quite similar, contrary to the predictions of Keynes.

However, Keynes (1936) still continues to be a major source of inspiration in the analysis of household consumption and saving behaviour. He aims to identify all the underlying motives behind the saving decisions of the economic agents such as

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[4] Keynes, (1936), "*The General Theory of Employment, Interest and Money*", Chapter 8, The Propensity to Consume I. The Objective Factors, pg. 96.

households and entrepreneurs. The motives for saving are derived from the social and economic environment of the individuals. Therefore, the discussion of the underlying motives for saving is not only comprehensive, but it is also seen as contemporary.[5]

According to Keynes (1936), there are eight different motivations for saving:

1. To build up a reserve against unforeseen contingencies (*the precautionary motive*);
2. To provide for an anticipated future relation between the income and the needs of the individual or his family different from that which exists in the present, as, for example, in relation to old age, family education, or the maintenance of dependents (*the life-cycle motive*);
3. To enjoy interest and appreciation, *i.e.* because a larger real consumption at a later date is preferred to a smaller immediate consumption (*the inter-temporal substitution motive*);
4. To enjoy a gradually increasing expenditure, since it gratifies a common instinct to look forward to a gradually improving standard of life rather than the contrary, even though the capacity for enjoyment may be diminishing (*the improvement motive*);
5. To enjoy a sense of independence and the power to do things, though without a clear idea or definite intention of specific action (*the independence motive*);
6. To secure a *masse de manoeuvre* to carry out speculative or business projects (*the enterprise motive*);
7. To bequeath a fortune (*the bequest motive*);

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[5] Keynes (1936), "*The General Theory of Employment, Interest and Money*", Chapter 9, The Propensity to Consume II: The Subjective Factors, pg. 107-109.

8. To satisfy pure miserliness, *i.e.* unreasonable but insistent inhibitions against acts of expenditure as such (*the avarice motive*).

Browning and Lusardi (1996) add one final motive for saving to the list above, which can be considered as a new development in today's society:

9. To accumulate deposits to buy houses, cars, and other durables (*the down-payment motive*).

One of the most important contributions is the introduction of the concept of *risk* into the analysis of behavioural economics. Moreover, Keynes (1936) is the first economist to introduce the *precautionary* demand for money. In addition to that, he places the precautionary motive for saving at the top of his list. The economic agent might wish to keep a certain amount of its wealth completely liquid, *i.e.* in the form of financial assets in order to be protected against unanticipated negative income shocks such as a spell of unemployment. In a consistent manner, the precautionary motive for saving must also be incorporated in the analysis of household saving decisions.

The Keynesian theory of consumption might have a consistent and inspiring macroeconomic approach, but empirical research shows that it is not sufficient for understanding household consumption and saving behaviour. The main criticism to the Keynesian approach is that it lacks microeconomic foundations, which reveals itself in the empirical analysis of cross-sectional data. Therefore, the theory needs to be advanced further, especially with the integration of the role of the individual in the decision-making process. The focus on the individual decisions-making process will also allow for the incorporation of social and demographic factors into the analysis.

The outline of this chapter is as follows: Section II.2 presents the Life-Cycle Theory of Saving and the Permanent Income Theory with a critical discussion of their

underlying assumptions. Section II.3 makes a formal presentation of the Theory of Inter-temporal Allocation of Consumption, which is based on the Life-Cycle Theory of Saving and the Permanent Income Theory. Section II.4 unites the Theory of Inter-temporal Allocation of Consumption with the individual decision-making process under risk and uncertainty. In this section, the influence of liquidity constraints and labour income risk on household saving decisions are analysed by using simple two-period models. Finally, Section II.5 concludes this chapter by emphasising the importance of empirical research in the development of Modern Consumer Theory.

II.2 – The Life-Cycle Theory of Saving / Permanent Income Theory

The novelty of the Life-Cycle Theory of Saving (Modigliani and Brumberg, 1954) and the Permanent Income Theory (Friedman, 1957) come from the pioneering microeconomic approach. According to this microeconomic approach, it is assumed that there is a rational individual, who is considered as a representative economic agent for the rest of society. The aim of the individual is to maximise utility from consumption with respect to the budget constraint. In life, the only source of utility is consumption and the budget constraint of the individual is the sum of life-time wealth. The allocation of life-time wealth across time periods evenly is the most efficient way of realising that aim for the individual.

The Life-Cycle Theory emphasises the importance of social and demographic factors in addition to income and initial wealth in individual consumption and saving decisions. Social and demographic factors such as age, gender, occupation, and education level play an important role in the formation of income and shape tastes and

preferences. Thus, it is necessary to incorporate these factors with income and wealth to understand individual consumption and saving decisions.

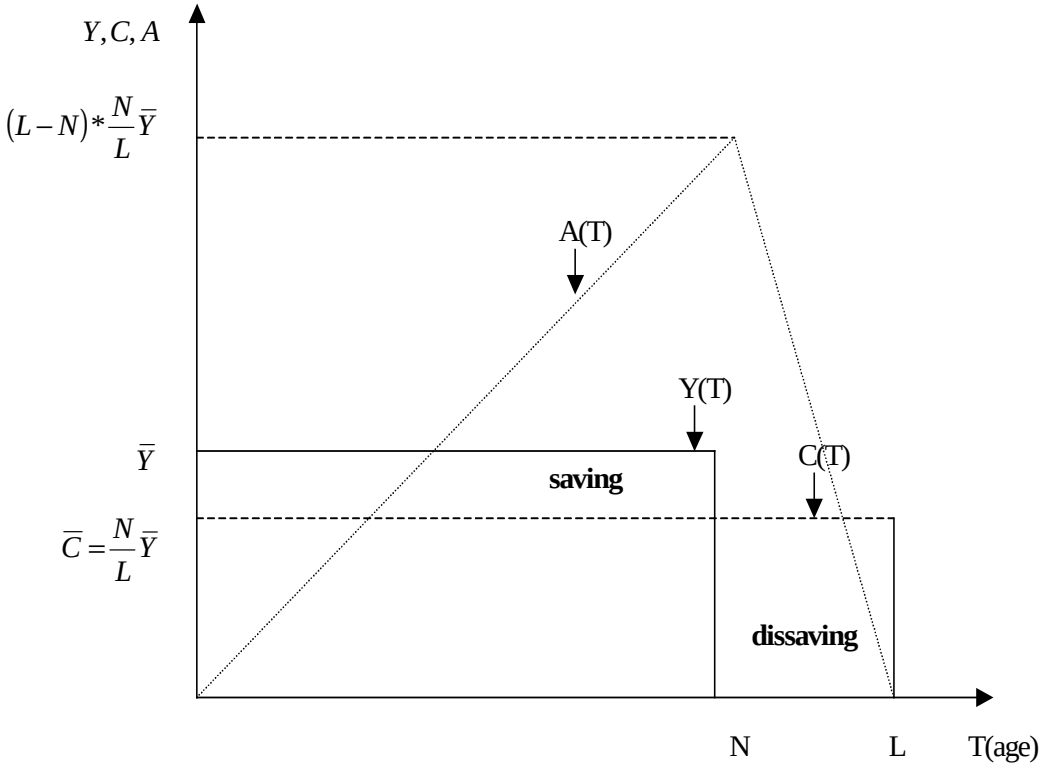
According to the Life-Cycle Theory of Saving, the sole purpose of saving is to finance future consumption for the individual. The individual's labour income is low in the initial periods of life, but labour income is expected to increase by the middle period of life and importantly, to fall again during the retirement. Consumption is realised through *borrowing* by relying upon future income at the early periods of life. The individual will have to repay debt previously accumulated in the early periods of life and to finance consumption during the retirement period. Thus, the individual prefers to save substantially during the middle period of his/her life, since labour income is greater during this period. The individual has to accumulate wealth to support consumption in response to the fall in labour income during the retirement period. Thus, the individual will succeed in keeping his/her consumption pattern steady despite the volatility of income throughout the life-time (Modigliani, 1986).

In stark contrast to consumption, saving will be highly volatile throughout the individual's life-time. Saving will be negative in the initial periods of his/her life, but it will become positive as the individual approaches his/her middle age. Nevertheless, saving will again become negative during the retirement period. In other words, the volatility of income will be directly reflected in saving.

The Life-Cycle Theory of Saving can be briefly summarised by Figure II.1, which is originally from Modigliani (1986). In Figure II.1, *Y*, *C* and *A* are income, consumption and assets, respectively. *L* is the life-time, whereas *N* is the working years of the individual, which starts immediately, and the time difference between them is the retirement period of the individual. This figure actually presents a simplified version of the theory, since both consumption ($\overline{C}$) and income ($\overline{Y}$) follow

a steady pattern and remain at their mean levels, which do not demonstrate any volatility in time. Moreover, consumption level ($\overline{C}$) is equal to the ratio of working years of the individual to his/her life-time multiplied by income level ($\overline{Y}$). The individual's assets reach their maximum value just before the retirement period. Consumption during the retirement period is financed with wealth accumulated during the working years.

Figure II.1 – Income, Consumption and Saving As a Function of Age



The underlying assumption of the Life-Cycle Theory of Saving is that the individual can borrow and lend as much as he/she needs and the interest rate for borrowing and lending will be the same. In fact, it is explicitly assumed that there are no *liquidity constraints*. However, the perfect capital markets assumption is not a realistic one, especially for developing countries. It is commonly observed that an

individual can get credit from financial institutions to a certain extent and only for expenditures on durable goods such as cars and housing. Even if consumer credit is available to the individual, the interest rate for borrowing is greater than lending.

In addition to that, *future labour income uncertainty* is not discussed as a relevant and significant topic in the Life-Cycle Theory of Saving. The element of uncertainty and any form of saving associated with uncertainty is eliminated from the discussion through certain strong assumptions. First, it is assumed that the individual has perfect foresight about future labour income prospects. Second, it is assumed that future labour income prospects are not exposed to risk. Thus, the Life-Cycle Theory of Saving does not allow for the emergence of the precautionary motive for saving.[6]

Friedman (1957) proposes the decomposition of income into its "*permanent income*" and "*transitory income*" components for a better understanding of individual consumption and saving decisions. Permanent income should be evaluated as the path of life-time wealth rather than simply a component of current income. It is possible to consider permanent income as the sum of labour and capital income, which is the life-time wealth of the individual. On the other hand, transitory income is composed of sudden chance occurrences to current income. Suitable examples of transitory income are windfall gains such as lottery wins or crop failures due to unexpected bad weather conditions.

According to the Permanent Income Theory, the individual determines the level of his/her consumption (C_t) in a single period as a constant fraction (k) of his/her permanent income (Y_t^P). The ratio of consumption to permanent income [$k(\phi)$] is an

[6] Moreover, the same theoretical conclusion can also be achieved with the introduction of the certainty-equivalence assumption.

implicit function, which depends on the interest rate, individual tastes and preferences and the level of wealth, see equation (2.1).

$$C_t = k(\phi)Y_t^P \tag{2.1}$$

However, transitory income changes do not have any effect on consumption and are reflected completely in saving. Thus, consumption is expected to be smooth compared to income, but saving will be highly volatile parallel to transitory income changes. In this respect, the Permanent Income Theory is consistent with the premises of the Life-Cycle Theory of Saving.

The empirical verification of the Permanent Income Theory is complicated due to the difficulty in the estimation of permanent income. Friedman (1957) suggests that it is feasible to forecast permanent income as a weighted sum of the individual's labour income from past periods as depicted in equation (2.2).

In this approximation, Y_t denotes current income realisations and Y_t^P is the permanent income of the individual at period *t*. The weights for the past realisations of labour income decrease as time elapses, since greater emphasis is placed on the recent realisations of the labour income ($\beta_1 > \beta_2 > \beta_3 > \ldots$).

$$Y_t^P \equiv \beta_1 Y_{t-1} + \beta_2 Y_{t-2} + \beta_3 Y_{t-3} + \cdots \tag{2.2}$$

Lucas (1976) criticizes the idea that permanent income can be approximated based on the past realisations of current income. Lucas (1976) claims that economic

agents are rational individuals, who make their economic decisions by considering all the available information and news about future periods in addition to their former experiences. Therefore, the rational expectations assumption is crucial in the analysis of the individual decision-making process including household consumption and saving behaviour.

In this respect, two major interpretations of saving emerged following the Life-Cycle Theory of Saving and the Permanent Income Theory. The only source of utility is consumption and saving cannot create utility for the individual on its own. Thus, the purpose of saving must be future consumption (Romer, 2001). To illustrate, a main reason for saving is to finance consumption during the retirement period for many households as suggested by the Life-Cycle Theory of Saving.

Second, as for the Permanent Income Theory, an individual saves for a "*rainy day*" (Campbell, 1987). An individual will increase his/her saving ratio, if he/she expects that his/her future labour income will fall. Hence, saving also depends on expectations about future labour income prospects. As a result of that relationship, saving will be a good predictor of expected income changes. For instance, a farmer will either raise his/her saving level or try to create additional income sources such as holding a second job, if he/she expects that his/her agricultural income will be low due to bad weather conditions.

II.3 – The Theory of Inter-temporal Allocation of Consumption

The virtue of the inter-temporal allocation of consumption across time periods is that it enables the individual to compare consumption and saving options from

short-run and long-run perspectives with each other. The inter-temporal allocation theory of consumption is based on several fundamental assumptions, which determine the shape and the properties of the utility function. First, the utility function, $U(C)$, is assumed to be additive and separable over time and goods. Second, it is assumed that the individual is rational and risk-averse as mentioned previously. This assumption requires that the first derivative of the utility function, $U'(C)$, is positive, while its second derivative, $U''(C)$, is negative, see equation (2.3). Hence, the utility function assumes concave a shape, which implies that the individual will choose to smooth consumption over time.

$$U(C) = \sum_{t=1}^{T} u(C_t) \Rightarrow U'(C) > 0 \;\&\; U''(C) < 0 \tag{2.3}$$

Third, the individual cannot be in debt at the end of the last period of his/her life. Thus, his/her life-time consumption (C_t) is constrained by his/her initial wealth (A_0) and his/her life-time income (Y_t), which includes both labour income and capital gains, as shown by equation (2.4).

$$\sum_{t=1}^{T} C_t \leq A_0 + \sum_{t=1}^{T} Y_t \tag{2.4}$$

Fourth, the individual does not have a bequest motive. Hence, the individual prefers to consume all his/her wealth by the end of the last period of his/her life. At

this point, it is necessary to impose structure on the utility function to advance the theory of inter-temporal allocation. For instance, Hall (1978) assumes that the utility function is quadratic, which is shown below (2.5), to derive the well-known "*random-walk*" hypothesis. According to this formulation of the quadratic utility function, "*a*" is the bliss level of consumption. The random-walk hypothesis suggests that the growth of consumption is not dependant on current income realisations.[7] Moreover, the marginal utility function becomes linear, when the utility function is quadratic (Figure II.2).

$$U(C) = \sum_{t=1}^{T} \left(C_t - \frac{a}{2} C_t^2 \right) \Rightarrow a > 0 \tag{2.5}$$

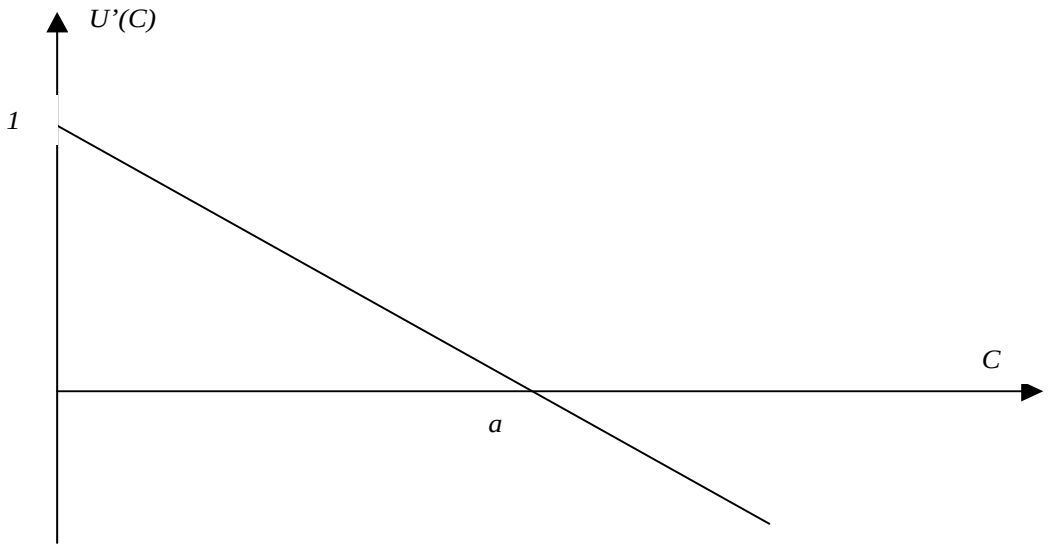
Nevertheless, the quadratic utility function has three controversial drawbacks. First, the quadratic utility function implies that the utility from consumption becomes negative after a certain bliss point. This property is shown in the Figure II.2 at point *a*, after which marginal utility of consumption is negative. This property of the quadratic utility function is inconsistent with one of the fundamental axioms of the consumer preference theory. It is assumed that the individual's demand for consumption is insatiable. Thus, the consumption of more of a good/service should always be better than less of it for the individual in terms of marginal utility gains.

Second, the quadratic utility function implies that the marginal utility function is linear. Hence, the marginal utility gain from consumption will be independent of the volatility of consumption at all levels. However, the choice of the quadratic utility

[7] See Chapter III for an extensive literature survey.

for the theoretical analysis results in the acceptance of a controversial assumption implicitly. The marginal utility gain/loss from a given consumption change will be the same at all levels of consumption. In other words, the individual will suffer the same value of marginal utility loss from a given amount of decline in consumption whether this decline occurs at a high level or a low level of consumption.[8]

Figure II.2 – The Linear Marginal Utility



Finally, the linear marginal utility function is inconsistent with the decreasing risk aversion assumption. It is assumed that the individual's willingness to take a given risk increases as the level of wealth increases. However, the selection of the linear marginal utility function for the theoretical analysis will also indicate that the individual's willingness to take risk will remain the same at all levels of wealth. Thus,

[8] For instance, a farmer from a developing country might suffer from a bad harvest due to unfavourable weather conditions. This will have a negative influence on his/her income and thus, consumption. The farmer can use his/her savings as a buffer-stock to keep his/her consumption pattern stable. However, if the bad harvest occurs after a series of negative income shocks, then all his/her savings will be spent previously and the farmer will have no means of protecting his/her life-style. Moreover, his/her consumption level will already be at a low level. Under these circumstances, the influence of income loss on the farmer will be even more detrimental. Therefore, it is reasonable to assume that at this point the loss of marginal utility from a further decline in income and consumption will be extensively high.

the quadratic utility function is not appropriate for the analysis of consumption and saving behaviour under uncertainty.

The individual aims to maximise the utility from consumption with respect to his/her budget constraint given the real interest rate (r), which is assumed constant over the life-time, and the subjective time discount rate (β). The utility maximisation problem of the consumer is presented as a *Lagrange multiplier* equation (2.6). The utility from future consumption is discounted by the subjective time discount rate (β), which makes utility gains from consumption from different points of time comparable to each other. The budget constraint indicates that life-time consumption cannot be greater than the sum of initial wealth and life-time income. The budget constraint is discounted by the real interest rate (r) and thus, it is given in present value (PV) terms.

$$L = \sum_{t=1}^{T} \beta^{t-1} u(C_t) + \lambda \left[\left(\frac{1}{1+r} \right)^{t-1} \left(A_0 + \sum_{t=1}^{T} Y_t - \sum_{t=1}^{T} C_t \right) \right] \tag{2.6}$$

The first-order condition of the utility maximisation problem leads to the Euler equation. Thus, the Euler equation shows that the marginal utility of consumption will be the same in all time periods, which is shown by λ in the equation (2.7). Moreover, E_t is the mathematical expectations operator conditional on all available news and information at time t. However, the explicit form of the Euler equation depends on the choice of the utility function. The real interest rate and the subjective time discount rate are also important in the formation of the Euler equation.

$$U'(C_t) = \left[\beta \left(\frac{1}{1+r} \right) \right] \mathrm{E}_t U'(C_{t+1}) = \lambda \tag{2.7}$$

The combination of the quadratic utility function with the assumption that the real interest rate is equal to the subjective time discount rate creates the random-walk hypothesis. In this framework, the individual keeps consumption at a constant level throughout his/her life-time. Thus, the consumption pattern becomes independent of the current income realisations, as depicted in equation (2.8).

$$C_t = \mathrm{E}_t (C_{t+1}) \tag{2.8}$$

The Euler equation implies that consumption in a single period will be a fraction of the individual's expected life-time wealth, see equation (2.9). However, consumption decisions will be dependent on expectations and new information about future labour income prospects. Therefore, it is thought that future labour income uncertainty must be considered as an integral part of the theory of inter-temporal allocation of consumption.

$$C_1 = \frac{1}{T} \left(A_0 + \sum_{t=1}^{T} \mathrm{E}_1 Y_t \right) \tag{2.9}$$

The main advantage of the random-walk formulation is its convenience for empirical analysis. However, it is important to point out that this basic formulation is not sufficient to discuss the implications of liquidity constraints and future labour income uncertainty on household consumption and saving behaviour.

II.4 – Individual Decision-Making Process under Risk and Uncertainty

Although the precautionary motive for saving is entirely consistent with the theory of inter-temporal allocation of consumption, it is often removed from Modern Consumer Theory through certain specific assumptions. The perfect foresight and the certainty-equivalence assumptions that generate the Permanent Income Theory and the Life-Cycle Theory of Saving eliminate the presence of risk and uncertainty from the analysis of household consumption and saving behaviour. However, the analysis of household behaviour becomes difficult, if there is uninsurable income risk and its implications on household saving decisions are neglected.

The theoretical development of the implications of income risk on individual saving decisions owes much to the groundbreaking contributions of Leland (1968), Sandmo (1970) and Dreze and Modigliani (1972). Leland (1968) develops a two-period consumption model, in which the second period labour income is stochastic to show that the existence of uncertainty leads to a precautionary demand for saving. In this respect, *precautionary saving* is defined as the amount of consumption postponed to safeguard against future labour income uncertainty. Sandmo (1970) provides a two-period consumption model with stochastic second period labour income to prove that future labour income uncertainty decreases current consumption and increases saving.

Sandmo (1970) demonstrates that the importance of income risk on saving decisions decreases as the level of wealth increases.

Dreze and Modigliani (1972) analyse the effects of uninsurable income risk on individual consumption and saving decisions with a two-period model. Their analysis confirms the findings of Leland (1968) and Sandmo (1970). In addition to that, they prove that consumption and portfolio decisions cannot be separated from each other, when future income risk is uninsurable. The individual's demand for risky assets will decline further, if he/she suffers from liquidity constraints and his/her future income is exposed to risk at the same time.

Let us assume that the interest rate is equal to the subjective time discount rate to simplify the analysis. Let us further assume that the third derivative of the utility function is positive, which will make the utility function assume a concave shape. It is feasible to establish a fundamental relationship under these assumptions. If the utility function is concave, then the expected marginal utility from future consumption will be greater than the marginal utility from expected future consumption as depicted in equation (2.10).

$$\mathrm{E}_t\left[U'(C_{t+1})\right] > U'(\mathrm{E}_t\left[C_{t+1}\right]) \tag{2.10}$$

This mathematical property of the expectation function is known as *Jensen's inequality*. Jensen's inequality indicates that the expected marginal utility from future consumption will be greater than the marginal utility from current consumption provided that the level of current consumption and the expected level of future consumption are the same, as shown in equation (2.11). Intuitively, it reflects the idea

that the individual places greater value on future consumption compared to current consumption under risk and uncertainty.

The marginal utility function becomes convex, if the third derivative of the utility function is positive. According to this assumption, the individual will reduce his/her consumption and raise his/her saving against future labour income uncertainty. The additional rise in saving is known as precautionary saving (Leland, 1968).

$$\mathrm{E}_t\left[U'(C_{t+1})\right] > U'(C_t) \tag{2.11}$$

An appropriate utility function to analyse saving behaviour under risk and uncertainty is the utility function that exhibits the Constant Relative Risk Aversion (CRRA) property, which is presented in equation (2.12). It is observed that the first derivative of the utility function is positive, but the second derivative is negative. Hence, the utility from consumption is monotonically increasing in consumption, but the marginal utility of consumption is decreasing in consumption. Consequently, the total utility of the individual from consumption is increasing in consumption, but at a slower pace.

$$U(C) = \frac{C^{1-\rho}}{1-\rho} \Rightarrow \rho > 1 \tag{2.12}$$

The significance of the CRRA type utility function stems from its property that the coefficient of risk aversion (ρ) is constant (2.13). Moreover, this feature of the

utility function represents the decreasing risk aversion assumption. The analysis of household consumption and saving behaviour under risk and uncertainty becomes possible, when the CRRA utility function is introduced, since the third derivative of the utility function is positive and the marginal utility function is convex. This feature allows for the precautionary motive for saving to exist under future labour income uncertainty.

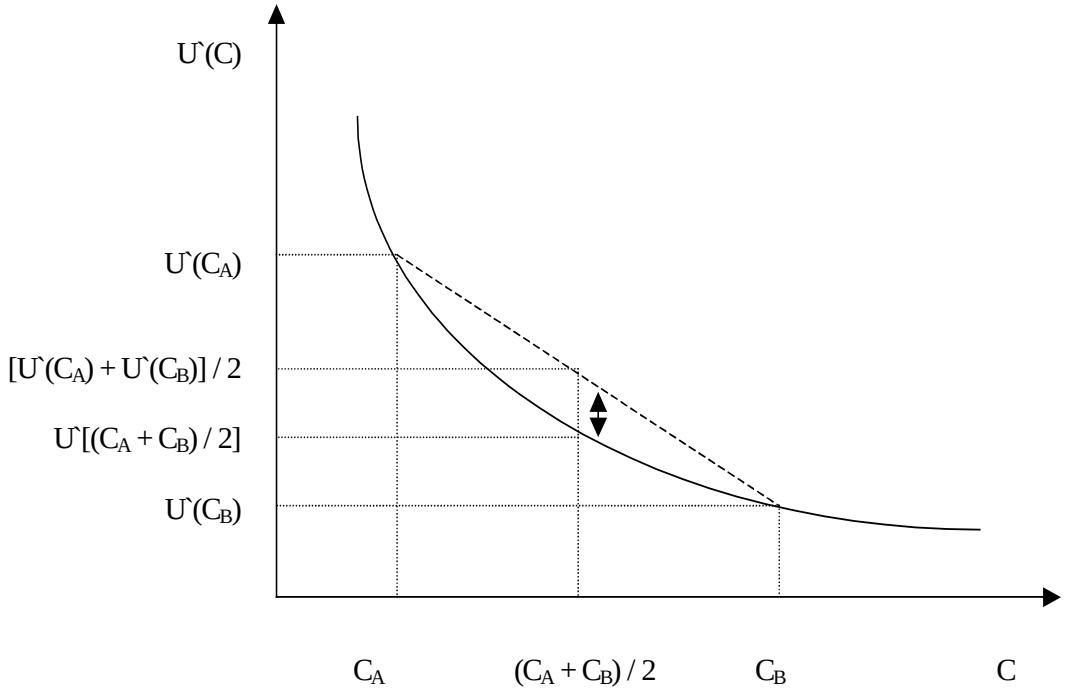
$$A(C) = \frac{U''(C)}{U'(C)} C = -\rho \tag{2.13}$$

Hence, the marginal utility from consumption decreases in consumption as before, but if the third derivative of the utility function is positive, then the marginal utility decreases less rapidly as consumption increases. However, the opposite case is even more interesting. The marginal utility loss from a decrease in consumption is significantly greater, if consumption is at a low level. For instance, an additional unit of food consumption creates a greater level of marginal utility, when the individual suffers from hunger because of poverty compared to the reverse case scenario that the individual is prosperous and food is abundant.

Panel a of Figure II.3 shows the influence of uncertainty on the expected marginal utility, when the marginal utility function is convex. If consumption takes only two possible values (C_A and C_B) each with equal probability (½), then the expected marginal utility of consumption is the average of the marginal utility at these two values. It is shown in the diagram that the average of the marginal utility, which

connects the mid-point of $U'(C_A)$ and $U'(C_B)$, is greater than the marginal utility of the average consumption $[(C_A + C_B)/2]$.[9]

Figure II.3 – The Convex Marginal Utility Function – (Panel a)

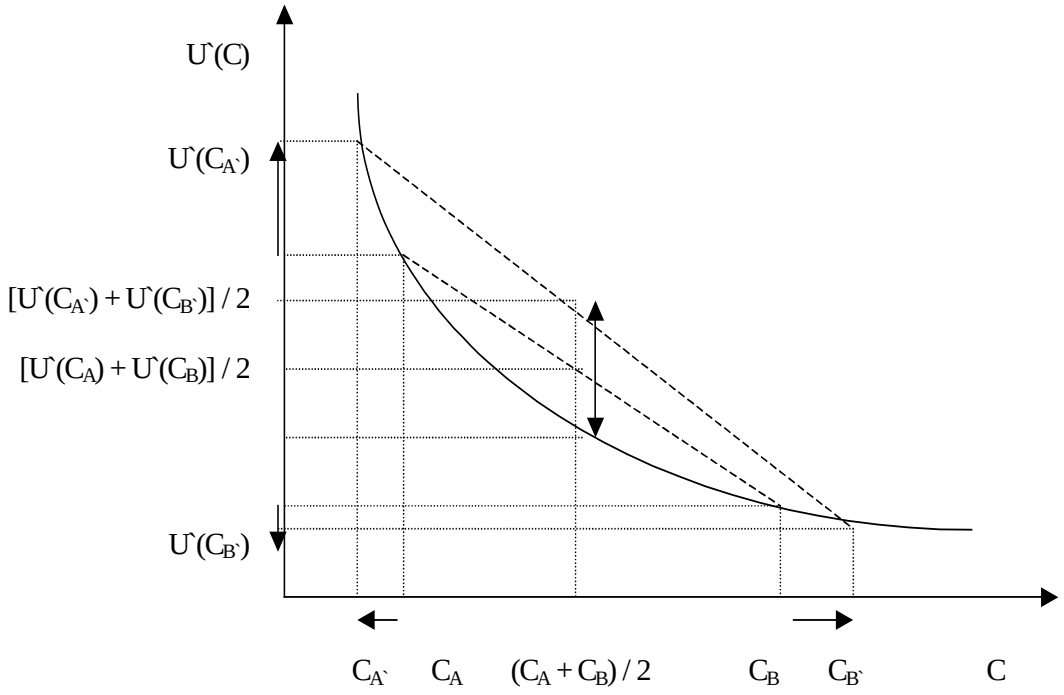


On the other hand, panel b of Figure II.2 shows the impact of uncertainty on saving decisions, when the marginal utility function is convex. It is observed that the marginal utility increases slightly, if consumption is already at a high level. However, it is also seen that the change in the marginal utility is significant, when consumption is at a low level. As shown in the graph, the expected marginal utility from consumption increases substantially as a result of an increase in the volatility of consumption, even if the mean of expected consumption remains the same. Thus, the increase in uncertainty raises the expected marginal utility for a given value of

[9] See Romer (2001).

expected consumption. Hence, the individual's willingness to save will increase under uncertainty.

Figure II.3 – The Convex Marginal Utility Function – (Panel b)



The Euler equation is the first-order condition of the individual's utility maximisation problem and it assumes the form shown in equation (2.14), when the CRRA type utility function is introduced together with the real interest rate and the subjective time discount rate factors.

$$\frac{C_{t+1}}{C_t} = \left[\beta(1+r)\right]^{1/\rho} \tag{2.14}$$

The contribution of this analysis is to improve the inter-temporal allocation theory of consumption to understand household saving decisions under risk and uncertainty. The analysis is particularly useful for understanding the saving decisions of individuals, whose future labour income prospects are exposed to risk, but the income risk is uninsurable.[10]

II.4.A – Liquidity Constraints

According to the theory of inter-temporal allocation, the individual plans to smooth his/her consumption and allocate his/her life-time wealth across time periods evenly. Hence, if the individual observes a sudden decrease in his/her income in a single period, then he/she will borrow to finance consumption only in that period. The individual will rely on his/her expected future labour income for this purpose.

However, the presence of liquidity constraints in the economy might interrupt the individual's consumption plans for future periods. Zeldes (1989a) suggests that the individual might accumulate financial assets to eliminate the possibility of binding liquidity constraints in the future. The amount of financial assets especially reserved for this purpose is defined as "*buffer-stock*" saving by Deaton (1991).

Let us develop a two-period model to analyse the influence of liquidity constraints on individual saving decisions.[11] It is assumed that the individual faces the possibility of being liquidity constrained only once in his/her life. At time 0, the

[10] For instance, the individual can be an unskilled worker from a developing country, who might face the possibly of becoming unemployed. However, it is important to emphasise that saving decisions are also influenced by the situation of the financial markets and the social security system in the country.
[11] See Gollier (2001).

individual has income of (w_0) and he/she decides how much to save (s_0). Thus, he/she consumes the difference between income and saving ($c_0 = w_0 - s_0$). However, at time 1, the individual observes his/her random income of ($w_1 + \tilde{x}$), which includes a stochastic component ($\tilde{x}$). Then, the individual decides how much to consume in the rest of his/her life ($c_1, c_2, \ldots, c_n$) given his/her previous income and saving [$(1+r)*s_0 + w_1 + \tilde{x}$] and given his/her certain income flow ($w_2, w_3, \ldots, w_n$) for the remaining periods.

In this model, the individual makes two separate consumption decisions. The first decision is realised before observing his/her random income at time 1, but the second decision is taken after that observation for the rest of his/her life. Therefore, the second consumption decision must be analysed initially in order to understand the first consumption decision.

Let us make two further assumptions in order to simplify the model. First, it is assumed that the individual's income flow is certain and constant for the remaining periods of his/her life ($w_2 = w_3 = \ldots = w_n = w$). Second, it is assumed that the real interest rate and the subjective time discount rate are equal to each other ($\beta = r$). If the individual does not face any liquidity constraints throughout his/her life-time, then his/her optimal saving amount will be the solution of the original utility maximisation problem, which is depicted in equation (2.15). In equation (2.15), h is the utility function from time 1 onwards as a function of income and saving at that time.

$$\max_{s} u(w_0 - s) + \mathrm{E}h[(1+r)*s + w + \tilde{x}] \tag{2.15}$$

Let us define y as *cash-on-hand* following Deaton's (1991) terminology at time 1 [$y = (1+r)*s + w + \varepsilon$]. Then, h will be the utility maximisation problem of the individual as a function of cash-on-hand (y), see equation (2.16).

$$h(y) = \max_{(c_1,\ldots,c_n)} \sum_{t=1}^{n} \beta^{t-1} u(c_t) \tag{2.16}$$

It is assumed that the income flow in each period is the same, except for the cash-on-hand of the first period. Since, the individual aims to maximise utility from consumption, he/she will try to keep the marginal utility from consumption equal to each other in all periods. Thus, the individual will allocate his/her life-time wealth evenly to each time period, as shown in equation (2.17).

$$h(y) = nu\left(\frac{y + (n-1)w}{n}\right) \tag{2.17}$$

If y is greater than w, the individual will consume only w plus $1/n$ of the difference between y and w at date 1. The rest of the financial resources will be allocated equally to the remaining $(n - 1)$ periods. However, if y is smaller than w, this negative income shock will be equally split over the n periods by borrowing $(n - 1)/n$ of the decrease in income $|y - w|$ from a financial institution. The marginal propensity to consume will be only $1/n$ in both situations.

It is observed that the individual will need to take only *1/n* of the risk on income, if there are no liquidity constraints. However, let us suppose that there are liquidity constraints and the individual cannot become a net borrower. Then, the value function of *h* is replaced by h_c, which is shown in equation (2.18).

$$h_c(y) = \begin{cases} u(y) + (n-1)u(w) \Rightarrow y \leq w \\ nu\left(\dfrac{y + (n-1)w}{n}\right) \Rightarrow y > w \end{cases} \tag{2.18}$$

In this case, if *y* is smaller than *w* and liquidity constraints are binding, then the individual has to absorb the decline in income instantaneously. As a result, consumption at time 1 will be equal to income, $c_1 = y$. Thus, it is observed that the marginal propensity to consume out of income increases from *1/n* to 1, when liquidity constraints are binding.

Even if liquidity constraints are not binding at time 0, the possibility that they can be binding in the future will have a positive impact on the optimal saving amount at time 0. If w_0 is large enough to compensate for income risk, then the saving amount (*s*) will be positive and liquidity constraints will not be binding at time 0. However, if this is not true and the future income risk is unfavourable, then the optimal saving amount will rise.

If the expected marginal utility of consumption, when liquidity constraints are binding, is greater than the marginal utility of consumption, when liquidity constraints are not binding, then the buffer-stock saving will be positive ($Eh_c` > Eh`$). This relationship is true provided that the utility function is concave, as depicted in equation (2.19).

$$y < w \Rightarrow u'(y) \geq u'\left(\frac{y + (n-1)w}{n}\right) \tag{2.19}$$

If the optimal saving amount is still positive after the income shock is realised, then liquidity constraints are not binding. However, if the optimal saving amount is zero or negative following the income shock, then liquidity constraints become significant. The individual has to borrow money from a financial institution to smooth his/her consumption, when his/her saving is not sufficient to do so. Otherwise, the individual will have to rely on only his/her current income, when he/she is prohibited from borrowing, see equation (2.20).

$$\frac{\partial c_1}{\partial y} = \begin{cases} 1 \Rightarrow y \leq w \\ 1/n \Rightarrow y > w \end{cases} \tag{2.20}$$

Hence, it is proven that the possibility that liquidity constraints might be binding in the future leads to the rise in the optimal saving amount under reasonable assumptions, specifically ($\beta = r$).

II.4.B – Prudence

Risk aversion and precautionary saving are intuitively similar concepts, but it is not possible to accept them simply as the same arguments. Even though, the risk aversion assumption is required for the precautionary motive for saving to exist, it is not sufficient on its own. In addition to that, the individual must be *prudent* to have precautionary saving under future labour income uncertainty (Kimball, 1990).

Let us consider a simple two-period model.[12] It is assumed that the individual has an income flow of (w_0 and w_1) and a consumption plan of (c_0 and c_1) under certainty. The individual's saving in the first period is $s = w_0 - c_0$, which will allow him/her to consume (rs) additional income in the second period given the constant real interest rate (r). The individual will determine s^* as the optimal saving amount under certainty in order to maximise his/her utility from consumption with respect to his/her income flow and the real interest rate, see equation (2.21). The instantaneous utility functions for two periods (u_0 and u_1) must be concave for the individual to have preferences for consumption smoothing. Moreover, the second period utility function is a discounted version of the first period utility function $u_0(z) = \beta u_1(z)$, where β is the subjective time discount rate.

$$H(s) = u_0(w_0 - s) + u_1[w_1 + (1+r)s] \tag{2.21}$$

[12] See Gollier (2001).

Both the necessary and the sufficient conditions for s^* will be given by a two-period Euler equation, which is depicted in equation (2.22). From this condition, it is observed that s^* is decreasing in w_1 and increasing in w_0. This result stems from the consumption smoothing preferences of the individual.

$$u_0'\left(w_0 - s^*\right) = (1+r)u_1'\left[w_1 + (1+r)s^*\right] \tag{2.22}$$

Now suppose that the second period income is not certain, but that there is a risk, which has an expected mean of zero, associated with income. Let us suppose that it is not possible to transfer this risk to the market and thus, the risk is uninsurable.

Gollier (2001) introduces an uninsurable zero-mean risk on the second period income in this model as a simple example of future labour income uncertainty. To compare this new version of the model, which incorporates uncertainty, with the model under certainty, will enable the researcher to analyse the impact of uncertainty on saving decisions, see equation (2.23).

$$H(s) = u_0(w_0 - s) + \mathrm{E}u_1\left[w_1 + (1+r)s + \tilde{x}\right] \tag{2.23}$$

If the optimum amount of saving from the model under uncertainty exceeds saving under certainty s^*, then it is concluded that uncertainty about the second period income increases saving and the difference can be interpreted as precautionary saving. For saving to rise under risk, the expected marginal utility from future consumption under uncertainty must exceed the marginal utility from future consumption under

certainty. Therefore, the expected marginal utility from future consumption must be greater than the marginal utility of future consumption, as depicted in equation (2.24).

$$\mathrm{E}u_1'\left[w_1 + (1+r)s^* + \tilde{x}\right] \geq u_1'\left[w_1 + (1+r)s^*\right] \tag{2.24}$$

It is understood from this analysis that the optimal saving amount under uncertainty will rise beyond its optimal amount under certainty. The individual aims to maximise the utility from consumption, which is constrained by the life-time wealth. The individual will shift consumption from the current period to the future periods, since the expected marginal utility from future consumption exceeds the marginal utility from current consumption under risk. Thus, the individual will prefer to raise his/her saving level in the current period in order to increase his/her future wealth. Thus, Kimball (1990) introduces the prudence concept to the saving literature. An individual is *prudent*, if adding an uninsurable zero-mean risk to his/her future wealth increases his optimal saving as shown in equation (2.25). This condition holds if and only if the marginal utility of future consumption is convex. This characteristic of the marginal utility function was first proven by Leland (1968). In this framework, prudence is defined as the degree of the precautionary motive for saving.

$$\mathrm{E}\tilde{x} = 0 \Rightarrow \mathrm{E}u_1'(z + \tilde{x}) \geq u_1'(z) \tag{2.25}$$

The future wealth (z) of an individual is stochastic, since it is composed of future labour income and interest earnings, which are in fact stochastic (x). However, the expected marginal utility of future consumption will be above the marginal utility

of future consumption for all levels of wealth under risk and uncertainty as shown in equation (2.25).

Kimball (1990) mainly proposes measuring prudence with the precautionary equivalent premium, ψ, which is the certain reduction in w_1 that has the same effect on optimum saving as the addition of a stochastic term on w_1. The expected marginal utility of future consumption will be equivalent to the marginal utility of future consumption with the introduction of the precautionary equivalent premium, ψ. The premium depends on the level of wealth, the distribution of risk and the degree of convexity of the marginal utility function, as shown in equation (2.26).

$$\mathrm{E}u_1'(z+\tilde{x}) = u_1'(z-\psi(z,u_1,\tilde{x})) \tag{2.26}$$

The precautionary equivalent premium, ψ, is equivalent to the compensating equivalent premium, π, which is shown in equation (2.27). This equality enables us to approximate the precautionary equivalent premium and the compensating equivalent premium with a formula parallel to the Arrow-Pratt approximation of risk premium.

$$\psi(z,u_1,\tilde{x}) = \pi(z,-u_1',\tilde{x}) \tag{2.27}$$

The Arrow-Pratt approximation is presented in equation (2.28), where *P(z)* is the index of absolute prudence.[13]

[13] Refer to Kimball (1990) for further discussion on prudence.

$$\psi(z,u_1,\tilde{x}) = \pi(z,-u_1',\tilde{x}) \cong \frac{\mathrm{E}\tilde{x}^2}{2} P(z) \Rightarrow P(z) = \frac{-u'''(z)_1}{u''(z)_1} \tag{2.28}$$

Kimball (1990) explores the similarities and differences between risk aversion and prudence. Although the degree of risk aversion and the degree of prudence are directly related, it is not correct to accept these concepts as the same. Risk aversion is controlled by the degree of the concavity of the utility function, whereas prudence is controlled by the degree of the convexity of the marginal utility function. Therefore, it is necessary to utilise a convex marginal utility function to present these discussions in a formal manner.

In this respect, it is feasible to measure the degree of prudence of an individual by using the precautionary equivalent premium. Thus, it is also possible to compare the prudence levels of individuals. An individual with a utility function defined on future consumption u_1 is more prudent than another individual with a utility function defined on future consumption u_2 at all wealth levels, if and only if $\psi(z, u_1, x)$ is greater than $\psi(z, u_2, x)$ given wealth and risk (z, x) levels. This is true only if the index of absolute prudence of the first individual $P_1(z)$ is greater than the index of absolute prudence of the second individual $P_2(z)$. It is observed from the approximation of the precautionary equivalent premium, which is shown in equation (2.27), that there is a direct transformation between the precautionary equivalent premium and the index of absolute prudence:

I. The precautionary equivalent premium $\psi(z, u_1, x)$ is nonnegative for all wealth and risk (z, x) levels if and only if the index of absolute prudence $P_1(z)$ is nonnegative for all wealth levels (z).

II. The precautionary equivalent premium $\psi(z, u_1, x)$ of the first individual with utility function on future consumption u_1 will be greater than the precautionary equivalent premium $\psi(z, u_2, x)$ of the second individual with utility function on future consumption u_2 at all wealth levels if and only if the index of absolute prudence of the first individual $P_1(z)$ is greater than the index of the second individual $P_2(z)$.

III. The precautionary equivalent premium $\psi(z, u_1, x)$ is decreasing in wealth (z) for all risk factors (x) if and only if the index of absolute prudence $P_1(z)$ is decreasing in wealth (z).

Moreover, risk aversion and absolute prudence are directly linked with each other. Absolute prudence must be decreasing uniformly provided that absolute risk aversion is also decreasing uniformly. Decreasing absolute risk aversion is a widely accepted assumption in the economics literature. In this context, decreasing absolute prudence states that the sensitivity of consumption to future income risks declines as the level of wealth increases. Therefore, the direct relationship of risk aversion and absolute prudence is considered as an argument in favour of the precautionary saving hypothesis.

It is possible to derive significant conclusions from this two-period model. First, the optimal saving amount under uncertainty will be higher than the optimal saving amount under certainty. Second, the sensitivity of consumption and saving to future income risks will diminish as the level of wealth increases. Intuitively, the

vulnerability of the relatively wealthy individuals to future income risks will be less compared to the individuals with less wealth accumulation.

II.5 – Conclusion

The advancement of Modern Consumer Theory is a remarkable achievement, which represents a positive example for all the fields of economics. However, Modern Consumer Theory can be advanced with the integration of the concept of income risk into the analysis of household consumption and saving behaviour. The precautionary saving hypothesis is consistent with the fundamental premises of Modern Consumer Theory. Moreover, contemporary discussions place a greater degree of importance on income risk and its influence on household consumption and saving behaviour.

A major advantage of Modern Consumer Theory is its openness to empirical research, which is an integral dynamic of the development of the theory. For instance, the time-series analysis of Kuznets (1946) is the starting point of the progression from the Keynesian theory of consumption to the Permanent Income Theory and The Life-Cycle Theory of Saving. Consequently, the next chapter will present a comprehensive literature survey on the empirical validity of Modern Consumer Theory with special emphasis on the alternative formulations of the consumption and saving functions such as the precautionary saving hypothesis.

Chapter III

Literature Survey

III.1 – Introduction

The purpose of this chapter is to present a comprehensive literature survey on household consumption and saving behaviour. The emphasis is especially placed on empirical research, which analyses the empirical validity of the Life-Cycle Theory of Saving and the Permanent Income Theory. According to the theory of inter-temporal allocation of consumption, the growth of consumption must be independent of current income realisations, which is discussed in the previous chapter on Modern Consumer Theory. However, empirical research reveals that the growth of consumption tracks the growth of income closely (Flavin, 1981). The *excess-sensitivity* of consumption to changing expectations about income leads to a rejection of the strict version of the theory. Therefore, the strong relationship between the growth of consumption and the growth of income contradicts the main principles of the Life-Cycle Theory of Saving and the Permanent Income Theory.

There might be several plausible explanations for the empirical failure of the Life-Cycle Theory of Saving and the Permanent Income Theory that are discussed in

the economics literature (Browning and Lusardi, 1996). However, the presence of liquidity-constrained households in the economy and the influence of future labour income uncertainty on household consumption and saving behaviour emerge as the most reasonable ones, especially within the context of developing countries (Deaton, 1989). Recent empirical research points to the important role of the precautionary motive for saving in economic agents' decisions to have a better understanding of household behaviour (Carroll, 2001a and Gourinchas and Parker, 2002).

The outline of this chapter is as follows: Section III.2 analyses the influence of liquidity constraints on household consumption and saving behaviour. Section III.3 presents a detailed survey of empirical research papers on the precautionary saving hypothesis with a special emphasis on the proxy variables for uncertainty such as the volatility of income or health risk. Section III.4 focuses on empirical research on developing countries, since the case of developing countries poses greater challenges for households compared to developed countries due to the low income level, imperfect capital markets and greater macroeconomic uncertainties. Moreover, the lack of high quality cross-sectional and panel data sets makes the analysis household behaviour from developing countries difficult. Finally, Section III.5 concludes this literature survey chapter with a critical discussion of the existing empirical literature and directions for future empirical research.

III.2 – The Influence of Liquidity Constraints on Household Behaviour

Both the Life-Cycle Theory of Saving (Modigliani and Brumberg, 1954) and the Permanent Income Theory (Friedman, 1957) assume that an individual can borrow

and lend as much as necessary and that the market interest rate for borrowing and lending will be the same. In fact, it is assumed that there are no *liquidity constraints* in the economy. However, it is frequently observed that an individual can get credit from financial institutions only to a certain extent and generally for durable goods such as housing investment or car purchase. Moreover, even if an individual gains access to credit, he/she definitely faces a higher interest rate for borrowing than lending.

According to the Permanent Income Theory, the individual determines his/her consumption level in a single period as a constant fraction of his/her life-time wealth. However, *when liquidity constraints are binding*, the individual is not able to transfer future income resources to the current period to smooth his/her consumption. In fact, he/she is unable to gain access to credit for consumption and even if he/she can access credit the real interest rate for borrowing will be higher than lending. At the same time, the individual will not be able to increase his/her consumption above his/her current income, even if his/her labour income is expected to increase steadily in the future. Thus, if the individual faces a temporary drop in income, then he/she has to finance consumption with current income and previously accumulated financial assets. It is reasonable to expect that the growth of consumption will be dependent on current income realisations under these circumstances. As a result, the presence of liquidity constraints leads to a higher level of MPC out of current income.

Consequently, it is argued that the observed levels of MPC out of current income, which are higher than zero, stems from the fact that a significant proportion of households in the economy are actually liquidity constrained. Empirical research using cross-sectional and panel data sets from household budget surveys and time-series data from national income accounting for the U.S. economy indicate that the MPC out of current income is not zero or close to zero as predicted by the Permanent

Income Theory (Hall and Mishkin, 1982, Hayashi, 1982 and Campbell and Mankiw, 1989). Therefore, liquidity constraints are considered as one of the main reasons for the deviation of consumers' behaviour from the predictions of the Life-Cycle Theory of Saving and the Permanent Income Theory (Deaton, 1992a).

Hall and Mishkin (1982) observed that the MPC out of current income is at 20% level using several waves of the Panel Study of Income Dynamics (PSID) for the U.S. economy. However, PSID provides information only on food consumption data, which is thought to be less sensitive to expected changes in current income compared to the other components of household consumption such as expenditures on durable goods. The sensitivity of the growth of consumption to current income changes could be even higher if a more general definition of consumption was used in the empirical analysis. Hence, Hall and Mishkin (1982) claimed that the unexpectedly high value of the MPC stems from the existence of liquidity-constrained consumers in society.

Campbell and Mankiw (1989) combined expected income changes and the inter-temporal elasticity of substitution for a better explanation of the growth of the consumption function using aggregate data for the U.S. economy. They observed that the regression coefficients for expected income changes and real interest rate changes were both statistically significant. However, they found that the estimates of the inter-temporal elasticity of substitution were quantitatively very small. They observed that the elasticity of consumption growth with respect to current income growth ranges between 40% and 50% in the U.S. economy.

Campbell and Mankiw (1989) suggest that their empirical results reveal that a significant percentage of the consumers in the U.S. economy actually suffer from liquidity constraints. In particular, they argue that 40% to 50% of all households in the U.S. economy are actually liquidity constrained. For this reason, they also reject the

validity of the strict form of the Permanent Income Theory just like Hall and Mishkin (1982). Nevertheless, the problems associated with the utilisation of aggregate data to understand household behaviour, *i.e. the lack of household heterogeneity dimension*, apply to the empirical research of Campbell and Mankiw (1989) as well. Therefore, the econometric results of Campbell and Mankiw (1989) should be approached with caution.

Jappelli and Pagano (1989) provide empirical evidence at the country level to reveal the importance of liquidity constraints on consumption decisions. They explain that the sensitivity of the growth of consumption to current income changes is greater in countries, where the individuals can borrow smaller amounts of credit. Thus, they conclude that the presence of liquidity constraints must be considered as one of the main reasons of the empirical failure of the Permanent Income Theory.

However, the utilisation of aggregate data from national income accounting to test for the presence of liquidity constraints in the economy is problematic due to various reasons. First, the most controversial aspect of using aggregate data is that it neglects the heterogeneity among households. The theory of inter-temporal allocation of consumption principally applies to households. Household consumption and saving behaviour are directly influenced by the amount of wealth that they hold. Moreover, education level, social background, family status and age of the household head are significant factors that contribute to the formation of household behaviour. Hence, it is not possible to analyse the effects of these factors on household behaviour, when aggregate data are used in the empirical analysis. Therefore, it is essential to make additional assumptions to apply the predictions of the theory to aggregate data.

Second, the number of observations in time-series data is smaller compared to cross-sectional data, which might create inference problems in the empirical analysis.

Third, consumption and income are determined simultaneously in the economy. Thus, the Instrumental Variables (IV) estimation technique is used to eliminate the simultaneity bias from the parameter estimates.

In econometrics, an instrumental variable (*instrument*) can be used to produce a consistent estimator of a parameter, when the explanatory variables are correlated with the error terms. This type of correlation can be caused by endogeneity, omitted explanatory variables or measurement errors in the explanatory variables. In this situation, the ordinary least squares technique (OLS) produces biased and inconsistent estimates. However, if an instrument is available, consistent estimates may still be obtained. An instrument is a variable that does not itself belong in the explanatory equation, but it is correlated with the suspect explanatory variable and uncorrelated with the error terms in the explanatory equation (Greene, 1997).

In linear models, there are two main requirements for using an IV:

- The instrument must be correlated with the endogenous explanatory variables, conditional on the other covariates.
- The instrument cannot be correlated with the error term in the explanatory equation, since the instrument cannot suffer from the same problem as the original explanatory variable.

In the first stage of the IV estimation process, the explanatory variables are regressed on the instruments and the fitted values from the first stage regression are saved and utilised for the explanatory variables in the second stage regression. However, it is difficult to find instruments with strong explanatory power to proxy current income apart from its own lagged values. In particular, the IV estimation procedure requires a strong statistical relationship between the instruments and the

instrumented explanatory variables. Otherwise, it is not possible to reach precise parameter estimates with high statistical significance levels.

Zeldes (1989a) analyses the influence of liquidity constraints on household behaviour using several waves of the PSID for the U.S. economy. He splits his data set into two households groups according to their wealth holdings. In particular, he considers the ratio of wealth holdings to income as an appropriate measure to find whether households suffer from liquidity constraints or not. Intuitively, households with lower wealth to income ratios are more likely to suffer from liquidity constraints. The empirical analysis confirms the expectations that households with lower wealth to income ratios are more sensitive to current income changes. However, Zeldes (1989a) can only use expenditures on food consumption as a proxy for total consumption due to its unavailability in the PSID, which is the main criticism of his empirical findings.

As pointed out by Zeldes (1989a), liquidity constraints do not prevent the individual from saving more, but they certainly prohibit the individual from consuming more than current income, when liquidity constraints are binding. The individual can finance his/her usual consumption level, only if he/she has previously accumulated a substantial amount of liquid assets. For this reason, an individual with a substantial amount of liquid assets is less likely to be liquidity-constrained. However, individuals with smaller wealth holdings and more uncertain future income prospects are more likely to suffer from asymmetric information in the financial markets such as adverse selection and moral hazard. Hence, only the possibility that liquidity constraints might be binding in the future can force individuals to raise their saving level in the current period. The possibility that binding future liquidity constraints might lead to the rise in household saving, even if liquidity constraints are not binding in the current period, is introduced in the literature by Zeldes (1989b).

Deaton (1991) performs a simulation analysis to show that the possibility of facing liquidity constraints in the future increases the optimal amount of saving. The *Buffer-Stock Saving Model* introduced by Deaton (1991) provides key insights into the individual's consumption and saving decisions. The individuals are actually able to decrease the volatility of consumption compared to the volatility of current income realisations by using their previously accumulated savings. His analysis reveals that even a low level of liquid assets might be sufficient to smooth consumption compared to income. It is observed that only in times of serious and consecutive income shocks that the individuals spend all of their previously accumulated financial assets. However, they are able to accumulate a certain amount of financial assets following the income shock once again.

The presence of liquidity-constrained households in society is considered as a plausible explanation of the excess sensitivity puzzle. Although, many empirical studies found that the growth of consumption is excessively sensitive to expected current income changes, liquidity constraints may not be the only reason for this phenomenon. Shea (1995) observes that union contracts have strong statistical power compared to any other variable to explain expected income growth using the PSID survey for the U.S. economy. Thus, he uses this constructed measure of expected current income growth to explain the growth of consumption for a sample of selected households from the PSID. He observes that the constructed measure, which is based on union contracts, for expected income growth is quantitatively large and statistically significant in the consumption growth equation. Thus, his empirical analysis provides evidence against the validity of the random-walk hypothesis.

Moreover, Shea (1995) continues his empirical analysis by dividing the households into two sub-groups on the basis of their savings in order to understand

their consumption and saving behaviour. First, he separates the sample into two parts depending on whether households have liquid assets to run down in case of low income or not. Second, he carries out the estimation procedure separately for the household group with positive savings, since these households are able to finance consumption by using previously accumulated financial assets. Third, he repeats the same estimation procedure for the household group, which does not have positive savings. However, he observes similar regression coefficients for expected current income growth in the growth of consumption equation for both household groups. Therefore, he concludes that there is no empirical evidence that liquidity constraints are the sole reason for the dependence of the growth of consumption on expected current income changes.

Garcia *et al.* (1997) use the Consumer Expenditure Survey (CEX) and the PSID to analyse the effects of liquidity constraints on household consumption and saving behaviour in the U.S. economy. Following Zeldes (1989a), they divide their sample set from CEX into two household groups on the basis of their wealth to income ratio. They expect that households with less wealth holdings are more likely to suffer from liquidity constraints. The empirical analysis confirms their claim that consumption expenditures of households with lower wealth to income ratios are more sensitive to current income changes. However, wealthy households are also sensitive to current income changes, contrary to their anticipations.

In addition to the initial empirical analysis, Garcia *et al.* (1997) evaluate social and economic criteria to determine the financial situation of households. They try to find whether households are likely to be liquidity-constrained or not. They perform their econometric regressions using the liquidity constraints criteria that they develop. Nevertheless, the extension of the empirical analysis does not create any difference in

the econometric results. Thus, they conclude that the excess-sensitivity of the growth of consumption to expected changes in current income might also stem from *myopia* or *asymmetric information*. Liquidity constraints do not have to be the only reason for the empirical failure of theory of the inter-temporal allocation of consumption.

Souleles (1999) analyses the response of household consumption to income tax refunds using microeconomic data from the CEX surveys from 1980 to 1991 for the U.S. economy. Income tax refunds are announced well before they are distributed and households are able to calculate the amount of income tax refunds before they receive them. Hence, according to the Permanent Income Theory, the marginal propensity to consume out of income tax refunds should be zero. Moreover, income tax refunds represent an expected contribution to household income. For this reason, one is not required to use any proxy or instrument to estimate the change in income. It is possible to estimate the marginal propensity to consume out of income tax refunds by OLS. This situation enables the researcher to reach precise parameter estimates with good explanatory power from the econometric equation.

Souleles (1999) observes that liquidity constraints play an important role in household consumption and saving behaviour. However, he also points out that there are more than liquidity constraints that make up the excess-sensitivity puzzle, since unconstrained households also spend a significant fraction of their income tax refunds on durable goods. In fact, it is expected that unconstrained households should be able to realise their durable goods purchases throughout the year. He observes that household consumption expenditures are highly sensitive to income tax cuts contrary to the premises of the Permanent Income Theory. Empirical analysis suggests that the MPC out of income tax cuts is around 0.90, which is a very high level. In addition to that, household consumption expenditures are directed towards non-durable goods,

too, which eliminate any possibility of another saving motive. Once again, liquidity constraints do not resolve the excess-sensitivity puzzle. Thus, he divides his sample set into two sub-groups on the basis of their liquid assets. Following Zeldes (1989a), he assumes that households with lower wealth holdings are more likely to suffer from liquidity constraints. However, his empirical analysis does not provide evidence in favour of this hypothesis either.

Souleles (2002) analyses the influence of heterogeneity on household response to the income tax cuts, which took place during President Reagan's time in the U.S. economy. There were three consecutive tax cuts between 1981 and 1983. Moreover, households were able to predict the amount that they were expected to gain, since the second and third phases of these income tax cuts were pre-announced. Thus, this fiscal policy implementation creates a unique opportunity to test for the empirical validity of the Permanent Income Theory from a different perspective. Household heterogeneity includes individual specific characteristics such as a high discount rate for future consumption or precautionary motives for saving. At the same time, household heterogeneity might include demographic characteristics. For instance, it is reasonable to expect a higher MPC out of income tax cuts for families with a higher number of children. However, the empirical analysis reveals that the MPC out of income tax cuts are considerably high and do not vary significantly across households (Souleles, 2002).

III.3 – Empirical Research on the Precautionary Saving Hypothesis

Uncertainty might be influential on the well being of individuals. Specifically, uncertainty can change individuals' consumption and saving decisions through its impact on life-time wealth. It will be difficult for the individual to assess his/her life-time wealth and determine his/her life-time consumption, especially if his/her future labour income is exposed to risk and the income risk is uninsurable. The individual might prefer to postpone his/her consumption expenditures and raise his/her saving level to accumulate additional financial assets to be protected against income risk. Thus, the individual's consumption pattern and saving decisions might diverge from the predictions of the Life-Cycle Theory of Saving and the Permanent Income Theory under uninsurable income risk.

Unfortunately, uncertainty cannot be observed as a quantitative variable in the economy. Therefore, it is necessary to utilize various proxy measures for uncertainty such as the volatility of income or the volatility of consumption. The volatility of consumption might capture the influence of different types of uncertainty in addition to future labour income uncertainty, since consumption is the focus of the individual's decision-making process. Dynan (1993, pp. 1105) asserts that: "Consumption variability is a better measure of risk because the consumption of an optimising household changes only in response to unexpected changes in income, which represents true risk."

The volatility of consumption is directly introduced into the Euler equation by a theoretical innovation. The growth of consumption equation is derived using the second-order Taylor-series approximation of the Euler equation under specific

assumptions. In particular, the utility function is assumed to exhibit the CRRA property. The advantage of this approach is its convenience for the econometric investigation process (Carroll, 2001b).

In the previous empirical literature, three main categories of risk are cited. It is necessary to analyse all of these risk categories to have a complete understanding of household consumption and saving behaviour. The first one is the uninsurable labour income risk, which is introduced in the literature by Kimball (1990). Future labour income uncertainty is generally considered as the single most important source of uncertainty for the individuals in the economy (Carroll, 1994). Future labour income uncertainty is closely linked with the possibility of becoming unemployed and losing labour income. Unemployment risk is not only important at the individual level, but also at the macroeconomic level. Carroll (1992) provides macroeconomic evidence that the amount of liquid assets that households keep to safeguard themselves against unemployment risk constitutes an important share of total liquid assets in the U.S. economy.

However, there might be various other sources of uncertainty in addition to future labour income uncertainty. The second type of uncertainty is health risk, which is especially important for old individuals in society. However, it is also a significant concern for individuals, who earn their living by selling their work-power in the labour market. Ill-health conditions will decrease the amount of time that the individual can allocate to work, which will also decrease labour income. Moreover, ill-health conditions require a higher amount of health expenditures, especially when the individual gets older. The individual has to spend less in order to save more, if he/she suffers or expects to suffer from ill-health. Therefore, the precautionary motive for saving, which includes health risk, can provide insight to understand why old

people generally spend less than predicted during the retirement period by the Permanent Income Theory (Deaton, 1992a).

The third type of uncertainty concerns the difficulty in the prediction of the life-expectancy. The individual will accumulate a greater amount of wealth to safeguard himself/herself from unforeseen negative income shocks at old age. The individual might need a greater amount of wealth to finance consumption during the retirement period, if he/she expects to live longer. The idea of poverty in old age will force individuals to hold more wealth during the retirement period (Deaton, 1992a).

Nevertheless, it is not possible to consider the previously mentioned measures of uncertainty in the literature as complete, since the source of uncertainty changes from one individual to another and also from one country to another. For instance, within the context of developing countries, an important source of uncertainty can be agricultural income due to its dependence on weather conditions, which are mostly unpredictable to farmers.

At the same time, the existence of uncertainty about future labour income prospects might act like an artificial borrowing constraint and might lead to a higher MPC out of current income. Even if the financial markets are perfect, the individuals might prefer not to borrow for consumption in the current period, when future labour income is uncertain (Zeldes, 1989b). Therefore, the individual will rely on current income and wealth holdings for consumption under these circumstances.

The researcher faces great difficulties in the identification of the source of uncertainty. However, the approximation of uncertainty in economic life is even more complicated. This dilemma leads to the utilisation of different measures of uncertainty

in the empirical analysis. Let us analyse previous empirical research to understand the importance of the precautionary motive for saving.

III.3.A – The Volatility of Consumption

Dynan (1993) improves the existing empirical literature on the precautionary saving hypothesis in three main points. First, she argues that a rational individual, who aims to maximise utility from consumption, will change his/her consumption plan only in response to unexpected income risk rather than the volatility of income. Thus, she claims that the volatility of consumption is a better measure of income risk. Second, she uses total household consumption expenditures in her empirical analysis instead of a data set, which is limited only to food expenditures. In particular, food expenditures do not follow the path of total consumption and they are highly smooth compared to total consumption. Instead, she uses a cross-sectional data set from the 1985 wave of the CEX, which provides total household consumption values for the U.S. economy. Third, her aim is to estimate *the coefficient of relative prudence* in order to reveal households' degree of prudence as a better way to reveal the importance of the precautionary motive for saving. She estimates the coefficient of relative prudence using the CRRA utility function and observes that the coefficient of relative prudence is quite low than was generally assumed in previous theoretical studies (Zeldes, 1989b and Deaton, 1991). Her highest estimate for the coefficient of relative prudence is smaller than one, but many previous theoretical studies assume that a reasonable range should be between two and five. Thus, she concludes that the precautionary saving motive must be an unimportant element of household behaviour.

The amount of liquid assets that households hold to protect themselves from future labour income uncertainty should be small given the low estimates of the coefficient of relative prudence. Moreover, she points out that her empirical results cast doubts on the risk-aversion assumption.

Carroll (2001a) makes a theoretical attempt to improve the Buffer Stock Saving Model to incorporate the precautionary motive for saving into the analysis, following Deaton (1991). He derives the second-order Taylor series approximation of the Euler equation to introduce the volatility of consumption as a new variable in the right-hand side of the growth of consumption equation. The volatility of consumption is expected to capture the effects of all types of risk that might affect household behaviour. He performs a simulation analysis to find the empirical importance of precautionary saving. His analysis indicates that the amount of financial assets, which was accumulated by households to safeguard themselves against future labour income uncertainty constitute a significant proportion, *i.e.* 40 % of total household wealth. Therefore, he concludes that the precautionary motive for saving is a significant component of household behaviour.

Gourinchas and Parker (2002) improve the theoretical models developed by Deaton (1991) and Carroll (2001a). Their theoretical model is derived from the inter-temporal allocation of consumption with respect to the budget constraint, while future labour income uncertainty prevails in the economy. There exists a realistic chance of unemployment, but it is assumed that the individual can borrow and save freely in the model. Even though there are no liquidity constraints, the individual will never choose to borrow against the future labour income due to future labour income uncertainty.

Gourinchas and Parker (2002) perform a series of simulation analyses to observe individual consumption and saving decisions under uninsurable income risk.

According to their model, there are two main reasons for saving in the economy. First, the individual saves to protect himself from uninsurable income risk and the low marginal utility of consumption associated with that. Second, the individual saves to finance consumption during the retirement period as predicted by the Permanent Income Theory. However, they observe that the precautionary motive for saving dominates at the initial and middle periods of life. After a certain age such as forty, the individual starts to save mainly for the retirement period. The predictions of the model are quite similar to the actual consumption. Both the predicted consumption data and the actual consumption data follow a close pattern. As pointed out above, consumption expenditures decline substantially after a certain age. The crucial aspect of the model is to introduce a realistic probability of unemployment for the formation of future labour income uncertainty. The primary contribution of this approach is to reconcile the precautionary saving hypothesis with the Permanent Income Theory.

Guariglia and Kim (2003b) analyse saving decisions of Muscovite households, who suffer from various types of income uncertainty during the transition period of the Russian economy. They analyse monthly data from the Household Budget Survey (HBS) for 1996 produced by Russian Central Statistical Committee for Moscow and its close surroundings. They choose the variability of the growth of consumption for two sub-groups of consumption expenditure as their risk measure. First, they look at the variability of the growth of expenditures on food. Second, they consider the variability of the growth of expenditures on non-durable goods and services, since it is a more general definition of consumption. Then, they regress household saving on the variability of the growth of consumption and social and demographic factors. They observe that household saving responds positively and significantly to the measures of

risk introduced in the saving equations, which provides empirical support in favour of the precautionary saving hypothesis.

III.3.B – The Volatility of Income

Deaton (1991) mainly focuses on the importance of liquidity constraints, while he claims that future labour income uncertainty also leads to buffer-stock saving. He observes that household consumption is sensitive and negatively correlated with future labour income uncertainty. Hence, his empirical analysis provides evidence in favour of the precautionary saving hypothesis indirectly.

Carroll (1994) uses a large panel data set both from the CEX and the PSID to analyse the impact of future labour income uncertainty on household behaviour. His empirical analysis indicates that the growth of consumption is sensitive to current income realisations, but it is not significantly influential on future labour income. However, future labour income uncertainty plays a significant role in the growth of consumption. Hence, Carroll (1994) provides empirical evidence to strengthen the proposition that household consumption and saving behaviour is vulnerable to future labour income uncertainty.

Carroll and Samwick (1997) analyse individual consumption and saving decisions using panel data from the PSID for the U.S. economy. The sensitivity of consumption to future labour income uncertainty is expected to decrease as the individual accumulates greater amounts of wealth to compensate for unforeseen negative income shocks. This argument is consistent with the decreasing absolute prudence assumption. They show that the individuals, who face a greater possibility

of losing their jobs and their labour income, accumulate greater amounts of wealth systematically. However, they observe that individual saving patterns are different from the predictions of the Life-Cycle Theory of Saving. According to the Life-Cycle Theory of Saving, the individual will start to save for retirement, since he/she starts to earn income at the initial periods of life. However, they claim that household saving is mainly driven by future labour income uncertainty at the initial periods of life. Only after a certain age, the individual starts to save for consumption during the retirement period. In this respect, they provide empirical evidence in favour of the precautionary saving hypothesis.

Subsequent empirical research reveals that individuals with uncertain future labour income prospects tend to save greater amounts (Carroll and Samwick, 1998). Browning and Lusardi (1996) provide an extensive survey of empirical research on precautionary saving. Browning and Lusardi (1996) argue that future labour income uncertainty is significant for explaining saving behaviour, especially for young people with low wealth levels. On the other hand, they accept that empirical research reveals the fact that the share of precautionary saving in total household savings is limited.

Carroll and Samwick (1998) analyse the importance of precautionary saving in total household saving using cross-sectional data from the PSID survey for the U.S. economy. They use the precautionary equivalent premium concept, first introduced by Kimball (1990), and the volatility of income as uncertainty measures in the empirical analysis. They claim that precautionary saving constitutes a substantial share, which ranges from 32% to 50% of total household savings.

Guariglia and Rossi (2002) find that labour income risk is significant in explaining the growth of consumption with habit formation for the U.K. economy. They use a large panel data set from the British Household Panel Survey (BHPS),

which covers the time period from 1992 to 1997. They use the variance of income as a proxy for future labour income uncertainty and observe that both past consumption realisations and future labour income uncertainty are statistically significant in the growth of consumption equation. Thus, their empirical analysis provides evidence in favour of the precautionary saving hypothesis.

Carroll *et al.* (2003) select the probability of job-loss risk to analyse the empirical importance of precautionary saving for the U.S. economy. Carroll *et al.* (2003) claim that the unemployment risk is a better measure of uncertainty compared to the volatility of income. In particular, they point out that the volatility of income depends on several factors, which might be controlled by the individual.[14] However, according to the precautionary saving hypothesis, the source of uncertainty must be exogenous to the individual as pointed out by Browning and Lusardi (1996).[15]

Carroll *et al.* (2003) use panel data from the Current Population Survey (CPS) and from the Survey of Consumer Finances (SCF) to estimate the probability of job-loss risk for individuals one year hence. They use the probability of job-loss risk as an uncertainty measure in their empirical analysis. They observe that their uncertainty measure is positively correlated and statistically significant, when regressed on total household wealth along with social and demographic variables. Their econometric results hold for households that come from middle and higher income segments of society, but not for low-income households. However, Carroll *et al.* (2003) cannot find any significant response to job-loss risk, when they exclude home-equity from

[14] Carroll *et al.* (2003) pg. 586 state that: "For example, a tenured college professor who, by choice, teaches or consults every other summer will have more variable annual income than a factory worker, but does not face the uncertainty of being laid off during a recession."

[15] According to Browning and Lusardi (1996), a potential uncertainty measure must be an observable variable, but an exogenous one to the individual's decisions and behaviour. Finally, a potential uncertainty measure must be *variable* across the population to account for the heterogeneity in society.

total wealth holdings. This final empirical observation of Carroll *et al.* (2003) seems interesting given the fact that the housing wealth is completely illiquid.

Recent empirical research by Meghir and Pistaferri (2004) aims to analyse the conditional variance of income by separating income into its permanent and transitory components. They use panel data from the PSID survey for the U.S. economy for the period from 1967 to 1992. The growth of consumption is sensitive to the conditional variance of the transitory component of income, which is associated with future labour income uncertainty. Meghir and Pistaferri (2004) observe that the growth of aggregate consumption significantly increases due to the precautionary motive for saving. Thus, they find empirical evidence in favour of the precautionary saving hypothesis.

III.3.C – Survey Measures

Guiso *et al.* (1992) analyse the importance of precautionary saving in total household savings empirically using cross-sectional data from the Bank of Italy Survey of Household Income and Wealth (SHIW) for the Italian economy for 1989. They use a self-reported measure of subjective earnings uncertainty from the survey questions. The respondents of the survey report their expectations of nominal labour income growth and inflation for the next year. Guiso *et al.* (1992) assume that nominal labour income growth is composed of inflation and real labour income growth. Thus, the variance of nominal labour income growth is the sum of the variance of real labour income growth, the variance of inflation and the covariance of real labour income growth with inflation. They calculate the variance of real labour

income growth using household expectations about nominal labour income growth and inflation. They use this calculated measure of the variance of real labour income growth as a proxy for future labour income uncertainty in the Italian economy.

Guiso *et al.* (1992) observe that the subjective earnings measure is statistically significant in the consumption function. In particular, it is observed that the variance of real labour income growth is statistically significant when regressed on the ratio of non-durable and services consumption to permanent income. Their empirical results are robust to the constant prudence and decreasing prudence assumptions. However, the estimated share of precautionary saving in total household saving is quantitatively unimportant. The ratio of liquid assets, which is held by households to safeguard themselves against future labour income uncertainty, to total household saving is only around 2%. Guiso *et al.* (1992) choose dummy variables for occupational groups as their main variables to instrument for the subjective income uncertainty in the IV estimation procedure.[16]

Lusardi (1997) criticises the choice of occupational dummy variables as the main instruments for subjective income uncertainty for the IV estimation procedure. She points out that more risk-averse individuals are also more likely to hold less risky jobs and less risk-averse individuals are more likely to choose more risky jobs. She claims that it is necessary to choose appropriate instruments to reveal the empirical importance of precautionary saving. According to her, a better instrument choice for subjective income uncertainty can be regional dummy variables, since regional dummy variables have arguably an exogenous relationship with the individual's tastes

[16] Because of the existing simultaneity problem in the consumption function, one needs to use the Instrumental Variables (IV) estimation procedure to reach precise and reliable parameter estimates. The IV procedure is still the most common estimation method in this literature. However, many recent empirical studies such as Banks *et al.* (2001), Guariglia and Rossi (2002), Guariglia and Kim (2003a) and (2003b) employ the Generalised Method of Moments (GMM) method for empirical analysis.

and preferences. In this manner, she observes that the share of precautionary saving in total household saving is actually around 20% using the same wave of the SHIW survey for the Italian economy for 1989.

Dreze and Modigliani (1972) claim that the individual's demand for risky assets will decline, if he/she suffers from liquidity constraints and/or uninsurable labour income risk. The individual will prefer to hold greater amounts of liquid and safe assets to be protected against unexpected negative income shocks. This approach is consistent with the portfolio choice theory in the sense that the individual will not find investing in risky assets desirable, when he/she already considers his/her future labour income stream under risk. The individual will not want to risk both his/her future labour income and his/her life-time savings at the same time. In this respect, Guiso *et al*. (1996) analyse the consumption and saving behaviour of Italian households using a cross-sectional data set from the SHIW survey for 1989. Their empirical findings confirm the theoretical proposition of Dreze and Modigliani (1972) that household demand for risky assets declines, if households suffer from uninsurable income risk and/or borrowing constraints. This empirical observation is consistent with the decreasing absolute risk aversion assumption and decreasing prudence assumption, which is essential for the precautionary saving hypothesis. Hence, Guiso *et al*. (1996) provide strong evidence in favour of the precautionary saving hypothesis.

Lusardi (1998) uses the first wave of the Health and Retirement Survey (HRS), which concentrates on old people aged between 51 and 61, for the U.S. economy for 1992. In one of the survey questions, the respondents are asked to express their expectations about the probability of losing their jobs. Lusardi (1998) derives the subjective probability of job-loss for the respondents using their responses to that particular survey question. She observes that the subjective probability of job-

loss is positively related to past unemployment, but negatively related to union membership and work experience as expected.

Lusardi (1998) develops the variance of income to proxy uncertainty under certain assumptions. If there is no unemployment insurance and no other income source, then it is possible to show that the variance of income equals $p(1 - p)Y^2$, where p represents the subjective probability of becoming unemployed and Y is the labour income. Lusardi (1998) uses the variance of income as a proxy for future labour income uncertainty in her empirical analysis. She introduces this uncertainty measure into the regression of the ratio of wealth to permanent income along with social and demographic variables. She observes that the variance of income is negatively correlated with the ratio of wealth to permanent income and statistically significant in the estimated econometric equation. In this respect, Lusardi (1998) provides empirical evidence in favour of the precautionary saving hypothesis. The precautionary motive for saving is an integral part of the wealth accumulation behaviour of old people, who are close to retirement. However, she points out that precautionary savings amount to only a small part of total household saving.

Guariglia (2001) analyses household saving decisions under earnings risk using panel data from eight waves of the BHPS for years 1991 to 1998 for the U.K. economy. The BHPS survey includes several questions designed to reveal how much additional saving households can put aside each month. Moreover, in the BHPS direct questions are asked to respondents in order to learn about their expectations about their job security. These survey questions are useful for developing an uncertainty measure, which is based on the subjective probability distribution of unemployment. In fact, households are asked to specify how likely they think they will become unemployed in the next twelve months period. Their responses are scaled over a

spectrum from zero (0) to one (1) to create a subjective probability distribution of unemployment. In this framework, p is the subjective probability of unemployment of the individual and the individual earns zero (0) labour income, if he/she becomes unemployed. Hence, the individuals' labour income is a random variable with mean $(1 - p)Y$, where Y is the current labour income. The variance of the labour income $p(1 - p)Y^2$ is utilised as the labour income risk variable for the empirical analysis.

The crucial aspect of the empirical analysis is the construction of risk variables to capture the impact of unexpected income changes on household saving decisions. Guariglia (2001) develops three separate risk variables by making use of the panel dimension of the data set to check the robustness of her econometric results. First, she develops an overall risk measure for each household by calculating the square of the difference in labour income between 1991 and 1998, and then dividing that by seven to reach an annual rate. The second risk variable is simply the variance of labour income in each year, which depends on the assumption that all income shocks are transitory. The third risk measure is the variance of the growth of labour income from one year to another, which depends on the assumption that all income shocks are permanent. Guariglia (2001) observes that British households increase their saving level, when faced with future labour income uncertainty. Moreover, the empirical analysis indicates that the econometric results are robust to different risk variables that are introduced into the saving equation. Therefore, Guariglia (2001) concludes that her empirical findings provide support in favour of the precautionary saving hypothesis.

Guariglia and Kim (2003a) propose wage arrears as a new uncertainty measure in order to analyse the validity of the precautionary saving hypothesis within the context of the Russian economy. They analyse a panel data set, which is formed

by several waves of the Russian Longitudinal Monitoring Survey (RSLM) for a period from 1994 to 1998. It is observed that many employees in Russia were not paid regularly during the transition period of the economy. Even the employees working at the state-owned enterprises suffered from wage arrears. In fact, wage arrears do not only lead to the decline of personal disposable income, but they also lead to the rise in future labour income uncertainty. Thus, wage arrears are considered as a significant source of uncertainty for households in the Russian economy. In addition to that, wage arrears satisfy the criteria required for the specification of an appropriate uncertainty measure for empirical analysis, previously identified in Browning and Lusardi (1996).

In one of the RSLM survey questions, the respondent is asked to reveal if his/her employer owes him/her money in the current period. Guariglia and Kim (2003a) develop a dummy variable for uncertainty created by wage arrears using this survey question. This wage dummy variable, which takes the value one if the answer to that particular survey question is positive, is regressed on a set of social, economic and demographic variables. In this way, Guariglia and Kim (2003a) are able to estimate the probability of suffering from wage arrears in the next period by using a random-effects probit model. They employ the estimated probability of suffering from wage arrears as an uncertainty measure in their econometric investigation process.

Guariglia and Kim (2003a) look at the impact of wage arrears on two different definitions of household saving. The first definition of saving that they choose is the difference between total disposable income and consumption expenditures on goods and services, while the second definition of saving adds expenditures on durable goods to the first one. Household saving is regressed on wage arrears along with a proxy variable for permanent income and social and demographic characteristics.

They observe that household saving increases in the current year for families, whose head is more likely to suffer from wage arrears in the next year. Thus, their empirical analysis provides strong evidence in favour of the precautionary saving hypothesis for the case of Russia, since households raise their saving level in the current period in response to future labour income uncertainty.

III.3.D – Health Surveys

Starr-McCluer (1996) analyses the economic relationship between health risk, the purchase of private health insurance and household saving behaviour. According to the precautionary saving hypothesis, households, who face greater health risk, are expected to hold greater amounts of wealth compared to the rest of society. This proposition is particularly relevant for older households, who would like to ensure their welfare during the retirement period. This argument is also consistent with the decreasing absolute prudence assumption. For this reason, she claims that there must be an inverse relationship between health insurance coverage and household wealth accumulation.

Starr-McCluer (1996) uses cross-sectional data from the SCF for the U.S. economy for 1989. An initial analysis of survey data shows that health insurance coverage is systematically higher for wealthy and well-educated individuals. In fact, it is observed that well-educated individuals have better employment opportunities, which guarantee them not only high income, but also health insurance coverage. Hence, it is possible to assert that there is an endogenous relationship between household wealth accumulation and health insurance coverage.

Household wealth is regressed on health insurance coverage along with social, economic and demographic variables. Among the set of explanatory variables, she introduces a dummy variable, which is derived from the survey questions and represents the probability of becoming ill given the individual's previous health record. She observes that there is a positive and statistically significant relationship between health insurance coverage and household wealth accumulation, contrary to the predictions of the precautionary saving hypothesis. However, she observes a negative relationship between potential health problems and household wealth accumulation. Thus, Starr-McCluer (1996) concludes that empirical evidence does not provide support for the precautionary saving hypothesis.

Guariglia and Rossi (2004) analyse the impact of health risk on household saving decisions using a panel data set from the BHPS survey for the U.K. economy from 1996 to 2000. Guariglia and Rossi (2004) also observe that there is a positive relationship between private medical insurance and household wealth accumulation, contrary to the predictions of the precautionary saving hypothesis. One plausible explanation for this empirical observation might be the overall success of the National Health Service (NHS), which provides a health care service in the U.K. economy. As an alternative explanation, it is possible to claim that individual tastes and preferences are an integral part of the purchase of private health insurance and household saving decisions. Guariglia and Rossi (2004) assert that the more risk-averse the individuals are the more likely they are to purchase private medical insurance and accumulate greater amounts of wealth at the same time.

Moreover, Guariglia and Rossi (2004) observe that there is crowding-out of household wealth accumulation by private medical insurance only in the rural and poor regions, where there are fewer NHS providers and the quality of medical service

is lower compared to the rest of the country. This empirical observation also confirms the argument, which emphasises the overall success of the NHS in providing a health care service in the U.K. economy.

III.4 – Empirical Research on Developing Countries

Previous empirical research on developing countries mainly concentrates on the empirical analysis of the validity of Modern Consumer Theory. The sensitivity of the growth of consumption to the changes in the permanent and transitory components of income is the focal point of the econometric investigation process. In general, the empirical analysis on developing countries leads to the rejection of the strict version of the theory, since it is observed that transitory income has a significant influence on the growth of consumption. However, it is also observed that the coefficient of the permanent component of income is greater than the transitory component of income. Thus, empirical analysis reaches the conclusion that households from developing countries smooth their consumption expenditures, but only to a certain extent.

Although, it is observed that households from developing countries succeed in smoothing their consumption, how they are able to realise this aim with significantly low-income and imperfect capital markets is not completely understood. Especially, households from the least developed countries do not only face future labour income uncertainty, but they also suffer from liquidity constraints. Hence, their consumption and saving behaviour still keeps its mystery. However, the empirical literature fails to investigate more sophisticated topics such as the role of the precautionary motive in household saving decisions in developing countries.

It is particularly interesting to analyse household consumption and saving behaviour in developing countries. However, Deaton (1989) admits that empirical research about household consumption and saving behaviour in developing countries is more complicated than developed countries for many reasons. First, the share of the agricultural sector in the economy is quite large and a greater fraction of consumers derive their income from agricultural sector, which makes household disposable income more volatile due to the effect of unpredictable weather changes on agricultural production. Second, it is thought that the precautionary motive for saving should be more important for households from developing countries because of macroeconomic uncertainties and political instability. Finally, the social security system is not developed enough to satisfy the needs and demands of the individuals in society.

Moreover, national saving is the major source of finance for investment in developing countries. Therefore, it is reasonable to expect a positive and significant relationship between the saving ratios and the economic growth rates in developing countries. However, there are important problems about the measurement of national saving figures for conceptual and practical reasons:

I. The measurement of national saving rates is quite problematic, since saving is defined and calculated as merely the difference between disposable income and consumption expenditures. For this reason, measurement errors that are related to these two economic variables are accumulated in the national saving figures.

II. In the case of developing countries, the size of the unregistered economy might also lead to the underestimation of disposable income compared to consumption expenditures and thus, bias saving figures downwards.

III. The measurement of private saving rates is even more questionable, since it is calculated using the double difference methodology in many developing countries. The estimation of public sector disposable income is subtracted from national income, which gives private sector disposable income and finally, the subtraction of private consumption expenditures from private sector disposable income results in private saving figures. Thus, all the measurement errors are accumulated in the private saving figures in this methodology.

IV. Moreover, even if private saving figures are available, generally it is not feasible to separate corporate saving from household saving, which restricts empirical analysis.

On the other hand, the lack of microeconomic data such as household budget surveys restricts empirical research on household consumption and saving behaviour. Unfortunately, there are only a small number of developing countries, which perform household budget surveys that account for disposable income, saving and social and demographic variables. As a result of these empirical issues, it is often observed that microeconomic and macroeconomic data sets are not consistent with each other.

Deaton (1992b) analyses saving behaviour of rural households, who are working in the agricultural sector of Cote d'Ivorie. He observes that households are able to save transitory components of income and also saving is a good predictor of expected income changes. However, he concludes that household saving behaviour is not completely consistent with the premises of the Permanent Income Theory. He argues that households in developing countries smooth their consumption, but it is still an interesting question as to how they can be successful given future labour income uncertainty and imperfect capital markets. Moreover, Deaton (1992c) claims that households in developing countries try to smooth consumption and consider

future income prospects in their consumption and saving decisions. However, it is not possible to argue that the household saving follows the age pattern suggested by the Life-Cycle Theory of Saving. Therefore, he concludes that the empirical analysis does not support a strict version of the theory.

Paxson (1992) observes that farmers in Thailand are able to save a significant fraction of their transitory income to smooth their consumption expenditure. Paxson (1992) develops a novel measure to observe unexpected/transitory shocks to income using rainfalls in Thailand. It is observed that there is a positive and significant relationship between rainfalls and agricultural production in Thailand, which indicates that any change in the rainfall from the usual trend will lead to expected income gains or losses. She observes that there is also a strong and positive relation between this measure of expected income changes and household saving. Households are able to save a significant portion of increases in their transitory income. Thus, she concludes that households behave in line with the main premises of Modern Consumer Theory.

Deaton and Paxson (1993) find that households in the Taiwanese economy behave in line with the predictions of the Life-Cycle Theory of Saving. They analyse household consumption and saving behaviour in the Taiwanese economy using repeated cross-sectional surveys for the years from 1976 to 1990. However, they also observe that consumption tracks income closely, which leads to the rejection of the strict version of the Life-Cycle Theory of Saving.

An alternative option available to households from developing countries is to increase the number of sources of their income to smooth their consumption (Deaton, 1997). It is known that households in developing countries hold a second job to increase their income and to support their families, when their savings are not sufficient for their needs. For instance, it is observed that farmers search for additional

employment in the other sectors of the economy such as the service sector, if they expect that their agricultural revenues will be low. In addition to that, households also try to increase the number of income-earners in a family to diversify the sources of their disposable income. As the average size of a family might be quite large in a developing country, this approach tends to be a very common and useful one.

Kochar (1999) analyses Indian farmers' future income prospects and their saving decisions. He observes that farmers in India try to smooth their consumption mainly by smoothing their income. Farmers shift their labour from farm work to off-farm work, when they expect a decline in their agricultural revenues. Thus, Kochar (1999) suggests that the diversification of labour between agricultural and other economic activities such as holding seasonal jobs can be a feasible way to smooth income and thus, consumption.

Jalan and Ravallion (1999) investigate the degree of vulnerability of rural households to uninsurable income risk in rural China. They estimate the MPC out of current income ratios of poor and rich people separately for several regions of the country. Their findings reveal that the MPC ratios are lower for the richer segments of society. Moreover, they observe that the MPC ratios increase consistently as the empirical analysis moves to low-income regions of the country. Thus, they conclude that wealthy households are better protected against uninsurable income risk, since their lower MPC ratios point out their ability to smooth consumption. Moreover, the findings of Jalan and Ravallion (1999) can be considered as empirical evidence in favour of the decreasing absolute prudence assumption. In this respect, their empirical analysis provides support for the precautionary saving hypothesis indirectly.

Kochar (2004) analyses the saving behaviour of rural Pakistani households using a similar methodology to Deaton (1992b) and Paxson (1992). In particular, he

analyses the influence of adult health on households' saving decisions and portfolio choices of using cross-sectional data. He observes that the possibility of ill-health in the future leads to an increase in the amount saved, but also to a decline in demand for productive and risky assets. Therefore, his econometric results are consistent with the findings of Guiso *et al.* (1996). The empirical analysis of Kochar (2004) is considered as indirect evidence in favour of the precautionary saving hypothesis. It is observed that households direct their savings towards more secure assets in response to health risk and uninsurable income risk. The addition of health risk to uninsurable income risk raises the overall risk level for the households extensively, which changes their consumption and saving behaviour. Hence, households choose to protect themselves against different types of risk by investing in safe assets, when there is no available insurance market.

Meng (2003) analyses household consumption and saving behaviour using a survey conducted for urban regions of China, entitled the 1999 Urban Household Income, Expenditure and Employment (UHIEE). He discusses the employment conditions in the Chinese economy starting from 1995 and the changes that took place in the labour market until 1999. He claims that the transition of the Chinese economy towards a more liberal structure decreased the job-security in the economy swiftly, especially in the urban regions. Thus, the transition of the Chinese economy increased future labour income uncertainty, which creates a valuable opportunity to test for the precautionary saving hypothesis.

Meng (2003) uses the variance of the previous years' labour income as an uncertainty measure. He also considers the predicted probability of unemployment as a proxy for future labour income uncertainty in the empirical analysis. He observes that labour income uncertainty has a negative and statistically significant effect on the

consumption function using both proxy variables. In this way, his empirical analysis provides direct evidence in favour of the precautionary saving hypothesis.

III.5 – Conclusion

Previous empirical research mainly focuses on the Life-Cycle Theory of Saving and the Permanent Income Theory. However, most research studies find empirical evidence against the strict form of the theory. First, the excess sensitivity of the growth of consumption to current income realisations still remains as a puzzle, which is against the premises of the theory. Second, household saving behaviour does not appear to be consistent with the predictions of the theory. It is observed that households hold a smaller amount of financial wealth compared to the predictions of the theory, but also households prefer to keep their saving level high during their retirement period, contrary to the predictions of the theory. Nevertheless, households are still able to smooth their consumption expenditures with respect to current income realisations even with a low level of saving. This is especially the case for households from developing countries. Consequently, these empirical observations lead to serious criticisms against the empirical validity of the Life-Cycle Theory and the Permanent Income Theory.

First, the perfect capital markets assumption of the Life-Cycle Theory and the Permanent Income Theory should be criticised. Liquidity constraints are considered as one of the main reasons of the empirical failure of the theory. However, there is also empirical evidence against this suggestion (Garcia *et al.*, 1996). Second, it is also claimed that the impact of uninsurable income risk on individual consumption and

saving decisions is neglected. The precautionary motive for saving can contribute to a better explanation of household behaviour. However, the empirical importance of the precautionary saving is generally observed to be small (Browning and Lusardi, 1996 and Dynan, 1993).

At the same time, the social security system can play an important role in alleviating the importance of the precautionary motive for saving. Hubbard *et al.* (1995) claim that for very poor people increasing their utility by relying on social support schemes is more reasonable compared to making additional saving. Poor households' accumulated savings remain well below the necessary level to finance high quality living- standards, since their income is quite low compared to the rest of society. Therefore, households that belong to the poor segments of society are already entitled to unemployment benefits and free public health care services in the developed countries. Moreover, friends and relatives provide a similar social support for the family. This is especially the case in developing countries, where traditional values are still very important. In a way, society tries to compensate for the lack of a sufficient social security system in the country.

Chapter IV

The Impact of Labour Income Risk on Household Saving Decisions

IV.1 – Introduction

The Republic of Turkey realised a series of major economic policy changes and yet she still suffered from financial and economic crises during the last three decades. Ultimately, all of these economic and political events contributed to the transformation of the Turkish economy from its stagnant position in the 1970s towards a market-oriented liberal economy in the 2000s at the beginning of a new century. Today, Turkey is considered as an emerging market economy and her economic progress is recognised by international economic institutions such as the IMF and the World Bank. Moreover, Turkey started negotiation talks with the EU for full membership in the first half of 2006.

However, the transformation of the economy was painful for the Turkish society. The transformation process left its mark on the labour market and agricultural sector in a clearly visible way. The economic development of the country became possible due to the cheap and productive labour of a young and well-educated workforce.

The labour market of Turkey is not considered as flexible, especially in the public sector, but workers from the private sector also experience certain difficulties. In this respect, the difficulties, which are faced by the private sector employees in the labour market can be summarised in four main headings.

- The majority of the labour force works at the minimum wage rate.
- It is estimated that half of the labour force works in the unregistered economy.
- Union membership is limited among private sector workers.
- The coverage of unemployment insurance is limited for various reasons.

Therefore, a significant fraction of the young population wishes to become a civil servant, when they enter the labour market. The presence of job security and the social security coverage in the public sector, which includes health expenditures and pension funds, influence the decisions of young people and shape their preferences.

Currently, the Turkish government is working on a new policy framework, which will improve the social security system. However, it is quite reasonable to think that the situation of the economy has influenced household consumption and saving behaviour in the past. Especially, the lack of a comprehensive social security system must have affected household saving decisions negatively during these difficult years.

Tansel (1992) analyses the causes and the outcomes of moonlighting in the Turkish economy. She uses the TURKSTAT Labour Market Surveys for the period between 1988 and 1994. It is often asserted that civil servants like teachers hold additional jobs to increase their income level, which might not be directly related to their professions. However, it is difficult to measure the contribution of moonlighting to the family income, since it is normally part of the unregistered economy.

Tansel (1992) develops a probit model for voluntary labour market participation for prime age male income-earners. She observes that male income-earners from rural regions of the country hold second jobs, which are indirectly related to the agricultural sector. In other words, moonlighters take advantage of their job-experience and training in their search for a second job. Empirical analysis reveals that land ownership is one of the main determinants of moonlighting in Turkey. Therefore, it is found that moonlighting is an important economic activity both in the rural and urban regions of the country.

Özcan *et al.* (2003) analyse the determinants of private saving in the Turkish economy using time-series data for the period between 1968 and 1994. They reach mixed results concerning the role of public saving in the economy. It appears that public saving does not crowd out private saving, contrary to their expectations. Their econometric results underline the severity of borrowing constraints in the economy during this period. Moreover, Özcan *et al.* (2003) use inflation volatility as a proxy measure for macroeconomic uncertainty in the economy and observe that it has a positive influence on private saving. They consider the positive relationship between inflation variability and private saving as empirical evidence in favour of the precautionary saving hypothesis. However, their empirical analysis is based on time-series data, which cannot provide information about individual consumption and saving decisions. Moreover, the real interest rates climbed to very high levels after 1980s and especially, at the beginning of 1990s. Therefore, the positive impact of inflation on private saving might actually stem from significant interest earnings during this period.

The aim of this empirical research chapter is to analyse the influence of labour income risk on household saving decisions in Turkey. Although, the analysis of

household consumption and saving behaviour is arguably one of the most interesting topics in economic theory, the empirical literature is far from being satisfactory. Specifically, there is a significant gap in the literature from a microeconomic point of view. Thus, I utilise the TURKSTAT Household Budget Surveys for this purpose. Furthermore, the econometric estimation of the share of precautionary saving in total household saving is an important aspect of empirical analysis.

The outline of the rest of this chapter is as follows: Section IV.2 presents a formal interpretation of the Permanent Income Theory, which is considered as the theoretical background of the precautionary saving hypothesis. Moreover, the theory behind the approximation of permanent income is discussed in this section. Section IV.3 presents a descriptive analysis of the TURKSTAT Household Budget Surveys. Furthermore, the econometric results are also presented and discussed in this section. Finally, Section IV.4 concludes this empirical chapter with a brief discussion of alternative strategies implemented by households to protect themselves against labour income risk instead of accumulating precautionary savings.

IV.2 – Theoretical Background

IV.2.A – A Formal Interpretation of the Permanent Income Theory

The key principle of the Permanent Income Theory is the fact that the individual's life-time consumption cannot be greater than the life-time resources of the individual (Friedman, 1957). It is assumed that there is a rational and risk-averse individual in the economy, who is representative for the rest of society. Moreover, the

only source of utility is consumption. Therefore, the individual aims to maximise utility from consumption with respect to the budget constraint, which is the total life-time resources of the individual.[17] In this context, saving is defined simply as the difference between current income and consumption. It is assumed that consumption follows a steady pattern throughout the individual's life, which leaves saving quite volatile during that period. In addition to that, unexpected income changes are also reflected in saving, which makes it even more volatile compared to consumption.

According to this interpretation of the Permanent Income Theory, the ultimate purpose of saving is future consumption. Hence, Campbell (1987) suggests that it is plausible to evaluate this definition as "*saving for a rainy day*". The individual raises the amount of saving if future income prospects are bleak and/or uncertain. This interpretation allows for the establishment of a direct link between saving and future income prospects. In this respect, saving will be a good predictor of expected income changes.

In this framework, it is possible to define consumption as the present value (PV) of wealth and expected life-time income (4.1):

$$c_t = \frac{r}{1+r} A_t + \left(\frac{r}{1+r} \right) \sum_{i=0}^{\infty} (1+r)^{-i} \mathrm{E}(y_{t-i} \mid \Omega_t). \tag{4.1}$$

In this terminology, c_t is the real consumption, y_t is the real *labour* income, A_t is the real value of financial assets, r is the real interest rate, which is constant, and Ω_t

[17] See Chapter II for a comprehensive discussion of modern consumer theory.

is the information available to the individuals at time t upon which their expectations are based (Deaton, 1992).

$$s_t = \frac{r}{1+r} A_t + y_t - c_t \tag{4.2}$$

The equation (4.2) is substituted into the equation (4.1) to express the "*saving for a rainy day*" concept formally. Saving at time t (s_t) is the present value (PV) of all future expected falls in income, as shown in equation (4.3). In this equation, the symbol Δ indicates the backward first difference.

$$s_t = -\sum_{i=1}^{\infty} (1+r)^{-i} \mathrm{E}(\Delta y_{t+i} \mid \Omega_t) \tag{4.3}$$

At this point, it is important to indicate that the information at time t Ω_t is only available to the individual. Therefore, it is necessary to replace the information matrix of the individual Ω_t with the information available to the researcher H_t. The researcher has only limited information compared to the individual, $H_t \subseteq \Omega_t$. Subsequently, the equation (4.4) becomes a formal expression with observable variables, which is appropriate for empirical analysis.

The intuition behind the "s*aving for a rainy*" conceptualisation is that the individual raises the amount of his/her saving during the current period if he/she anticipates that his/her future labour income will be lower than its life-time average.

This is certainly the case for many households from the rural regions of developing countries. Since their agricultural revenues are dependent on favourable weather conditions, rural households are able to forecast their agricultural income level accurately by considering the developments in the weather conditions in the previous periods. Hence, they are expected to adjust their saving level according to the available information (Paxson, 1992 and Deaton, 1992b).

$$s_t = -\sum_{i=1}^{\infty} (1+r)^{-i} \mathrm{E}(\Delta y_{t+i} \mid H_t) \tag{4.4}$$

IV.2.B – The Precautionary Saving Hypothesis

The precautionary saving hypothesis proposes that households are forced to postpone their consumption expenditures and raise their saving level in order to ensure their welfare under risk and uncertainty. The postponement of consumption expenditures and the rise in the amount of saving will allow the household to accumulate financial assets. The main reason for the choice of financial wealth is the fact that it can be used almost instantaneously in times of need due to its liquid character. Hence, the presence of financial wealth guarantees the well being of the family. In this respect, p*recautionary saving* is defined as the amount of financial

wealth that households keep to safeguard themselves against future labour income uncertainty.[18]

Although, the precautionary saving hypothesis is widely accepted from a theoretical point of view, previous empirical research indicates that the share of precautionary saving in household saving is small and limited (Browning and Lusardi, 1996). A crucial aspect of the discussion on precautionary saving is that there are different types and sources of risk and uncertainty in the economy. Moreover, it is suggested that the complexity of the development of proxy measures for income risk contributes to the underestimation of the empirical importance of precautionary saving. For instance, individuals are not only concerned with the possibility of losing their jobs, but they are also worried about health issues because of the size of out-of-pocket health expenditures. Thus, it is essential to establish an alternative approach to understand the empirical importance of precautionary saving. A feasible option is to analyse the impact of each definition of income risk on household saving directly. This approach will allow for the determination of the most significant type of risk from the perspective of the households.[19]

An alternative formulation of household consumption and saving behaviour under labour income risk can be presented formally as (4.5).

$$S_h = \alpha_h + \beta \hat{Y}_h^P + \chi W_h + \lambda \tilde{U}_h + \gamma Z_h + u_h \tag{4.5}$$

[18] However, there is a significant theoretical and empirical difference between saving for a rainy day and precautionary saving. The precautionary motive for saving will emerge if and only if there is uncertainty about future labour income prospects.

[19] See Chapter III for more information on proxy measures for future labour income uncertainty.

The dependent variable (S) of this equation is household saving. There are two important explanatory variables on the right hand side of the equation. The first variable is the approximation of household permanent income (Y_P) and housing wealth (W). The next variable is the household head's labour income risk (U). The social and demographic variables matrix (Z), such as family characteristics, is also incorporated into the econometric estimation process.[20]

This alternative formulation of the saving function is inspired by Campbell's "*saving for a rainy day*" interpretation of the Permanent Income Theory. Previously, Guariglia and Kim (2003a) followed a similar approach to reveal the empirical importance of precautionary saving arising from wage arrears uncertainty in the Russian economy.

The introduction of permanent income and social and demographic variables into the econometric estimation process aims to capture the life-cycle motives that generate household saving such as saving for retirement. However, the underlying aim of this empirical research chapter is to observe the impact of labour income risk on household saving decisions.

The approximation of permanent income is realised following the seminal contribution of King and Dicks-Mireaux (1982). Permanent income (Y_i^P) is dependant on the age-income profile [$c(A_i)$] of the individual and his/her social and demographic conditions, which is shown by the Z_i matrix in the equation (4.6). In this equation, s_i is the individual-specific component and it is assumed that the error term s_i has zero mean and constant variance σ_s^2.

[20] The definitions and the summary statistics of the main economic variables are presented in the Empirical Analysis part of this empirical chapter in the descriptive analysis of the TURKSTAT Household Budget Surveys, which is Section IV.3.A.

$$Y_i^P = \alpha_i - c(A_i) + \sum_{k=1}^{K} \varphi_k Z_i + s_i \tag{4.6}$$

Current disposable income (E_i) might diverge from permanent income (Y_i^P) for two main reasons:

1) The age-income profile of the young individuals is generally higher than old individuals over the life-cycle due to economic growth $\left[h\left(A_i - \overline{A}\right)\right]$, where $\overline{A}$ is the assigned *standard* age level according to which permanent income is defined and

2) The second important source of differentiation is the transitory component of income, which is shown by (u_i) in equation (4.7). It is also assumed that u_i has zero mean, constant variance σ_u^2 and finally, it is not correlated with s_i.

$$E_i = \mu_i + \beta_i Y_i^P + h\left(A_i - \overline{A}\right) + u_i \tag{4.7}$$

The proxy variable for permanent income is obtained by using the fitted values from the regression of current disposable income on the age-income profile and social and demographic characteristics of the individual. The fitted values acquired from the current disposable income regression, which is shown in equation (4.8) are used as the permanent income variable in the household saving equation. Previously, Kazarosian

(1997) and Guariglia and Rossi (2004) followed a similar approach in the estimation of the permanent component of income.[21]

$$E_i = \mu_i + \alpha + g(A_i) + \sum_{k=1}^{K} \varphi_k Z_i + s_i + u_i \qquad (4.8)$$

where $g(A_i) = h(A_i - \overline{A}) - c(A_i)$

IV.3 – Empirical Analysis

The Institute of Statistics of the Republic of Turkey (TURKSTAT) performed several household budget surveys for the Turkish economy for 1994, 2002, 2003 and 2004 and also announced that it will continue to perform household budget surveys annually. The TURKSTAT household budget surveys are actually repeated cross-sectional surveys, which do not have a panel dimension unfortunately. However, these surveys provide extensive data about family structure, economic conditions, social and demographic characteristics at the individual and household level.

There are important differences between these household budget surveys. The two main differences are the macroeconomic developments in the Turkish economy during the survey years and the sample sizes of the surveys. From a macroeconomic point of view, it is necessary to keep in mind that the Turkish economy suffered from serious economic and financial crises in 1994 and 2001. These crises had a significant

[21] The permanent income variable, which is produced for this empirical chapter, is also utilised exactly in the same way in the following two empirical chapters; Chapter V and Chapter VI.

effect on household consumption and saving behaviour. Thus, only the Household Budget Surveys 2003 and 2004 represent household behaviour from a more stable period of the Turkish economy.

The Turkish economy suffered from high and chronic inflation throughout the 1990s and during the 2001 economic crisis. It was a period of the country, when monthly inflation rates were significant and disturbed household finances severely. However, the nominal values of disposable income, household consumption and housing wealth are not adjusted using appropriate inflation-accounting techniques in the Household Budget Surveys 1994 and 2002. As a result of that, it is unavoidable to observe negative saving figures for many households. Therefore, it is not possible to consider the results of these surveys as reliable for the analysis of household consumption and saving behaviour.[22]

The sample size and the content of the questionnaire of the Household Budget Survey 2003 are significantly larger than the rest of the surveys including the Household Budget Survey 2004. The Household Budget Survey 2003 has 25,764 household and 107,614 individual observations, whereas the Household Budget Survey 2004 has 8,544 household and 35,388 individual observations. Moreover, it is the only household budget survey, which provides information about household characteristics with respect to the geographical regions. Its questionnaire contains more diverse questions about household saving decisions, which do not exist in other household budget surveys. However, TURKSTAT will continue to perform

[22] Paxson (1992) adjusts household saving figures using appropriate inflation-accounting techniques due to the presence of high and chronic inflation at the monthly level in Thailand. Unfortunately, it is not known in which month these household and individual observations are collected. Thus, it is not possible to use a similar technique to adjust the nominal values from the TURKSTAT Household Budget Surveys 1994 and 2002.

household budget surveys for every year with a smaller sample size and a questionnaire in accordance with the Household Budget Survey 2004.

There might be different types of income risk, which are derived from different sources of individual disposable income. Therefore, empirical analysis must distinguish between different sources of individual disposable income. Identification of different types of income risk is an integral part of the empirical analysis.

The sources of individual disposable income can be classified as follows.

a. Wages and salaries
b. Entrepreneurship (business profits)
c. Agricultural revenues (agricultural sector)
d. Income transfers (from government, private sources, charities and abroad)
e. Interest income (financial assets)
f. Rent income (from housing and land investments)
g. Labour income from additional employment (moonlighting)
h. Labour income from seasonal employment

At this point, it is a good idea to categorise income groups with respect to the sources of individual disposable income. First, it is useful to develop a *labour income* category by bringing wages and salaries and labour income from additional employment and seasonal employment together (a, g and h). Second, it is necessary to consider *entrepreneurship* as a unique category, which is made up of only business profits (b). Third, it is more suitable to analyse *agricultural income* separately due to its distinct character (c). The remaining categories are *income transfers* (d) from

government and abroad, *interest income* from financial assets (e) and finally *rent income* (f) from housing.

In this respect, three significant types of income risk emerge parallel to the categorisation of income.

i. The first one is the *labour income risk*, which is derived from future labour income uncertainty.[23]

ii. The second one is the *business income risk*, which stems from entrepreneurial income from the business sectors.[24]

iii. The third one is the *agricultural income risk*, which is the dependence of agricultural revenues on seasonal weather changes and cyclical factors in production.

This empirical chapter will concentrate on the identification of labour income risk and its implications for household saving decisions. The second empirical chapter will analyse the role of entrepreneurs in the accumulation of precautionary saving. However, the impact of agricultural income risk on household saving decisions is not included in the second empirical chapter. The approximation of agricultural income risk is completely different than business income risk, since it requires the use of proxy measures based on unpredictable weather changes.[25] The third empirical chapter will take a different approach to analysing the precautionary saving hypothesis. It will investigate the influence of health expenditures risk on household behaviour and the relationship between purchases of private health insurance and precautionary saving.

[23] It is necessary to keep in mind that there are many different proxy measures for future labour income uncertainty in the economics literature.
[24] The business sectors are defined as industry, construction and the services sectors.
[25] See Paxson (1992).

IV.3.A – A Descriptive Analysis of the Household Budget Surveys

All of the Household Budget Surveys are carefully designed and implemented in order to acquire information about households' social and economic conditions, consumption patterns and life-quality. Household budget surveys are performed to observe the distribution of disposable income among individuals and households in society. Moreover, they are one of the main data sources to check the validity of social and economic policies. The reasons for the preparation of household budget surveys are presented at below.

- To determine the goods and services and their weights, which will be included in the consumer price index,
- To observe changes, which might occur in household consumption patterns over time,
- To reveal the distribution of disposable income among households and individuals in the country,
- To organise statistics, which will be used in the estimation of private consumption expenditures as part of national income accounting figures,
- To develop statistics, which are necessary for the determination of minimum wage rate,
- To perform a social and economic analysis of society such as the determination of poverty limits and the life-quality of the individuals.

The Household Income and Consumption Expenditures Survey was first realized in 1994. However, the implementation of this survey was disrupted by the

1994 financial crisis, which casts doubt on the results of the survey. Household Budget Survey 2002 was designed to gain information about income distribution in addition to household consumption expenditures. TURKSTAT started to prepare household budget surveys every year with a more dynamic approach to analysing the Turkish economy after 2002.

The TURKSTAT Household Budget Surveys 2003 and 2004 were designed and implemented with an unconventional format. Household budget surveys are prepared as cross-sectional data sets, which do not follow the same households from one month to another or from one year to another. Each month new and different households are interviewed to enlarge the coverage of the sample across the country and her regions. The purpose of this approach is to reach all geographical regions of the country as well as all income and consumption groups of society.

The TURKSTAT Household Budget Surveys 2003 and 2004 provide information about consumption expenditures and income distribution at the country level distinguishing between rural regions and urban regions.[26] The ratio of households from the rural regions to total households included in the survey is determined at a reasonable level of 30 % due to the similar distribution of the overall population across the country. However, it is also necessary to acknowledge that a significant amount of internal migration from the rural regions to the urban regions took place during the last two decades as a result of many economic and social factors.

[26] A settlement unit like a village or town is defined as an urban region, if the total population of the place is greater than 20.000 people. If its population is less than 20.000 people, then it is considered as a rural region. However, this definition of a rural region does not take into account economic sectors such as the role of the agricultural sector or tourism revenues in the local economy. Therefore, social and economic characteristics of rural regions might differ significantly between the west and east of the country.

The TURKSTAT Household Budget Survey 2003 was conducted with face-to-face interviews via 25,920 households, but households with significant missing information are dropped from the survey and the total of number of observations that remain in the sample is 25,764 households. Every month 1,512 new households from the urban regions and 648 new households from the rural regions of the country were interviewed in 2003. Hence, every month 2,160 new and different households are included in the survey with this approach. In a similar fashion, the TURKSTAT Household Budget Survey 2004 has 720 monthly changing new and different households from the urban and rural regions of the country. The total number of interviewed households reached 8,600 households in 2004. Once again, households with significant missing information are later dropped from the sample, which results in 8,544 households in the final sample.

Household consumption expenditures are not available annually in the TURKSTAT Household Budget Surveys. In the surveys, there are only monthly figures for household consumption expenditures. These monthly observations are multiplied by 12 to reach an annual estimate of household consumption expenditures under the strong assumption that household consumption follows a steady pattern throughout the year. On the other hand, individual and household disposable income variables are already available annually in the surveys. Annual household saving is calculated as the difference between household disposable income and household consumption expenditures. In this context, household saving is defined as a flow variable rather than a stock variable.[27]

[27] The definitions of the main economic variables and the dummy variables, which are used in the empirical analysis, are presented at the Appendix.

The difficulty with this approach is that any measurement error, which could be related to either household consumption expenditures or household disposable income, is directly reflected in household saving. For instance, it is thought that households tend to report their disposable income lower than its real value. Therefore, there is a significant possibility of underestimating household saving despite the design of the survey.

Household disposable income and consumption expenditures figures for 2003 and 2004 are presented in Table IV.1. The analysis of household disposable income and consumption expenditures figures indicates two main points. First, the positive growth rate in the economy translates into greater household disposable income and consumption figures over time in Turkey. Secondly, there is a significant income gap between the urban regions and the rural regions of the country.

Table IV.1 – Household Disposable Income and Consumption
(*Mean values, YTL, 2003 prices*)

	2003		**2004**		**Pooled Sample**	
	Income	*Consumption*	*Income*	*Consumption*	*Income*	*Consumption*
Turkey	10149.9	8378.1	11323.7	9532.6	10442.2	8665.6
Urban	10900.9	9168.1	12508.7	10524.3	11297.5	9502.6
Rural	8316.1	6449.1	8552.3	7213.1	8376.3	6643.7

Source: TURKSTAT Household Budget Surveys (Households)

More importantly, the income gap continues to grow despite the fact that disposable income also continues to grow across the whole country as a result of economic growth. Clearly, urban households have a greater income level compared to rural households, which might also contribute to the explanation of the high level of internal migration from the rural regions to the urban regions of the country (Table IV.1).

It is observed that the saving level is positive throughout the country, but the saving ratio varies from the urban regions to the rural regions (Table IV.2). The saving ratio is calculated as the ratio of household saving, which is the difference between household disposable income and consumption expenditures, to household disposable income. The decline of the saving ratio between 2003 and 2004 can be attributed to many economic and social factors. First of all, the high growth rate of the economy in 2004 must have contributed to the decrease in the saving rate. Probably, the improvement of the financial markets led to the rise in household consumption expenditures. Especially, the availability of long-term consumer credit with a lower rate of return increased the amount of house purchases.

Table IV.2 – Household Saving and Saving Ratios (%)
(*Mean values, YTL, 2003 prices*)

	2003		**2004**		**Pooled Data Set**	
	Saving	*Ratio (%)*	*Saving*	*Ratio (%)*	*Saving*	*Ratio (%)*
Turkey	1771.8	17.5	1791.1	15.8	1776.6	17.0
Urban Regions	1732.8	15.9	1984.3	15.9	1794.9	15.9
Rural Regions	1867.0	22.5	1339.2	15.7	1732.5	20.7

Source: TURKSTAT Household Budget Surveys (Households)

However, the most significant change took place in the agricultural sector of the economy during this time period. The restructuring of the agricultural support policies, which aimed to raise the efficiency and productivity, contributed to the fall in agricultural revenues. As a result of that, the rate of internal migration from rural regions to urban regions accelerated and the ratio of labour force working in the agricultural sector to the total labour force started to decrease significantly.

According to the TURKSTAT Household Budget Surveys, only 65 % of households have positive savings. The rest of the households do not have savings at all or they have negative savings. The ratio of positive savings remains almost the

same in both survey years. Moreover, the average saving amount more than doubles, if it is calculated without considering zero and negative saving figures. The presence of indebted households with negative saving levels affects the empirical analysis significantly.

The distribution of household disposable income and household consumption expenditures figures across regions for 2003 is presented in Table IV.3. The regional decomposition of household disposable income and household consumption expenditures figures are only available in the Household Budget Survey 2003. The analysis reveals that household disposable income steadily and significantly decreases as we move from the west to the east of the country.

Table IV.3 – Household Disposable Income, Consumption and Saving across Geographical Regions
(*Mean values, YTL, 2003 prices*)

	2003			
	Income	*Consumption*	*Saving*	*Saving (%)*
Turkey	10149.9	8378.1	1771,8	17.5
Istanbul	15,200	12,400	2,840	18.7
West Marmara	9,680	8,070	1,610	16.6
Aegean	9,900	7,980	1,910	19.3
East Marmara	10,500	8,620	1,860	17.7
West Anatolia	11,800	9,930	1,910	16.2
Mediterranean	9,990	7,920	2,070	20.7
Central Anatolia	8,240	6,870	1,360	16.5
West Black Sea	8,260	6,600	1,660	20.1
East Black Sea	9,780	8,200	1,580	16.2
North East Anatolia	8,890	7,440	1,450	16.3
Middle East Anatolia	9,230	8,070	1,170	12.7
Southeast Anatolia	7,030	6,500	534	7.6

Source: TURKSTAT Household Budget Survey 2003 (Households)

Household disposable income level is greater than the country average only in Istanbul, East Marmara and West Anatolia regions (Table IV.3). Istanbul is the richest and the most expensive city in Turkey as expected because of its size and population. Her income and consumption level is considerably greater than the rest of the country.

The capital city of Turkey, Ankara, is in the West Anatolia region and contributes to the rise in income level in this region.

At the other extreme, lies the Southeast Anatolia region, which is significantly different from the rest of the regions of the country in every social and economic aspect. It is not only the poorest region in the country, but it also has the lowest saving rate. The rest of the regions have a slightly lower household disposable income level compared to the country average. However, the saving rates are highly variable from one region to another region across the country. This observation also points out the difficulty of understanding household saving decisions in Turkey.

A family member, who plays a greater role than the rest of the members in at least one important issue, is chosen as the household head. Being the household head is not only related to generating income for the family, but it is also about taking responsibility for the legal, social and economic issues of the family. The household head in the survey does not have to be the highest income-earner, but he/she has the final say in the consumption and saving decisions of the family. Therefore, he/she is considered as the actual leader of the family.

It is observed that almost one third of the household heads are not working or searching for a job in the survey month. There are several reasons for being out of the labour market for the household heads. A significant majority of the household heads are older than 60 years of age and some of them are retired. Moreover, if the household head is a woman, she might prefer to stay out of the labour market and consider herself as a housewife.

Another interesting observation about household structure, which is related to the status of women in the family, is the fact that only 9.53 % of all household heads

are women. At first, this observation might suggest that this is a cultural issue and the Turkish society is still highly conservative. However, it is an obvious fact that the income level is also low in the Turkish economy. Hence, it becomes a necessity to form large families and share all income within the family. The extended family might be beneficial for the children, since there will be more funds available for their education and health expenditures with this approach.

The TURKSTAT Household Budget Survey 2003 has a particularly interesting question about households' saving preferences. Households express their saving preferences and the types of saving that they performed in the current month during the interview. They can choose among 11 separate categories to explain the type of their savings, if they realised positive savings in the survey month. Households' saving preferences point towards a more traditional society and economic activity in Turkey. It is observed that the most important categories are foreign currency, gold purchases and investment in business (Table IV.4).

However, more than 80 % of households claimed that they did not save at all in 2003. This is a significant proportion, which reveals that the distribution of household saving is highly skewed. It is also understood that a significant majority of households in Turkey are not capable of realising saving. It is probable that they have underestimated or misreported the total amount of their savings, but it is clear that most of them live in difficult social and economic conditions.

The precautionary saving hypothesis focuses on the financial wealth due to its liquidity. The saving options between 3 and 8 fall into this category and 11.2 % of households expressed that they chose one of these saving categories for themselves. At the same time, households that invest in financial assets constitute more than 60 % of households, which asserted that they realised positive savings. This kind of

household saving behaviour probably stems from the fact that the Turkish economy suffered from high and chronic inflation during the last two decades. It is thought that households are actually trying to protect the purchasing power of their money by investing in financial assets in an inflationary environment. Moreover, it is possible to interpret this kind of household saving behaviour as empirical evidence in favour of the precautionary saving hypothesis. Certainly, households prefer to keep a significant fraction of their savings as financial wealth, which might stem from several different reasons at the same time.

Table IV.4 – Households' Saving Preferences

Saving Options	**2003**		
	Frequency	*Percent. (%)*	*Cum. (%)*
1) Housing investment	455	1.8	1.8
2) Partnership in a housing co-op.	249	1.0	2.7
3) Gold	905	3.5	6.3
4) Foreign currency	1,184	4.6	10.8
5) Bank deposit	645	2.5	13.3
6) Stock exchange	32	0.1	13.5
7) Treasury bills and bonds	58	0.2	13.7
8) Hedge funds	52	0.2	13.9
9) Business investment	947	3.7	17.6
10) Lending money with interest	3	0.0	17.6
11) Other	231	0.9	18.5
12) No savings	21,003	81.5	100.0
Positive savings *	4,761	18.5	-
Financial Assets **	2,876	11.2	-
Total	25,764	100.0	100.0

Source: TURKSTAT Household Budget Survey 2003
* Positive savings are composed of saving options between the 1st and 11th categories.
** Financial assets are composed of saving options between the 3rd and 8th categories.

However, no information is available regarding the monetary values of households' financial assets. Thus, it is not possible to measure another type of household saving based on financial wealth, which could be analysed in the econometric investigation process. This is one of the main deficiencies of the TURKSTAT Household Budget Surveys, which leaves the researcher in a difficult

situation in the analysis of household consumption and saving behaviour in Turkey. Furthermore, this particular question has not been included in the questionnaire of the TURKSTAT Household Budget Survey 2004.

It is observed that household disposable income and household consumption expenditures are significantly influenced by the household head's occupation. At the same time, the saving level is highly variable across occupational groups. Especially, employers and self-employed people have substantially high saving rates compared to the rest of society. Moreover, it is quite apparent from the high level of disposable income and consumption expenditures that employers and self-employed people are wealthier compared to the salary-earners and wage earners as expected (Table IV.5). At the same time, their high saving rate might indicate their willingness to invest in a business in the future. It may be the case that, they would like to take advantage of a profitable business opportunity.

Table IV.5 –Household Income and Consumption for Occupational Groups from Household Budget Survey 2003 *

(*YTL, current prices*)

		Disposable Income		**Consumption Exp.**		**Saving**
	Number of obs.	Mean	Std. Dev. / Mean (%)	Mean	Std. Dev. / Mean (%)	(%)
Salary Earner	8,780	10,900	1.0	9,510	0.9	12.6
Wage Earner	1,510	5,180	1.8	5,320	1.7	-2.8
Employer	1,542	22,500	3.2	13,900	2.6	38.2
Self-Employed	6,175	9,050	1.1	6,860	1.0	24.2
Unemployed	619	6,240	3.1	6,340	3.4	-1.7
Retired	7,136	8,920	1.1	7,930	1.0	7.6
Total	25,764	10,100	0.7	8,380	0.6	17.5

Source: TURKSTAT Household Budget Survey 2003
* Household Heads

The results of the Household Budget Survey 2004 accord with those of the previous household budget surveys (Table IV.6). The majority of household saving is

accumulated in the hands of employers and self-employed individuals. However, salary-earners have a small amount of saving and in the case of wage earners, their saving ratio is negative in both household budget survey years. Actually, wage earners are the most vulnerable occupational group against future labour income uncertainty, since they have the least reliable job-security conditions in the economy.

Table IV.6 –Household Income and Consumption for Occupational Groups from Household Budget Survey 2004 *

(*YTL, current prices*)

		Disposable Income		**Consumption Exp.**		**Saving**
	Number of obs.	Mean	Std. Dev. / Mean (%)	Mean	Std. Dev. / Mean (%)	(%)
Salary Earner	2,929	13,300	1.4	11,800	1.4	11.4
Wage Earner	586	6,440	2.8	6,770	2.7	-5.2
Employer	486	27,400	5.1	16,100	4.8	41.2
Self-Employed	1,928	11,400	2.3	8,940	1.8	21.2
Unemployed	204	8,280	6.1	8,450	6.2	-2.1
Retired	2,411	10,600	1.5	9,640	1.7	8.9
Total	8,544	12,300	1.1	10,400	0.9	15.4

Source: TURKSTAT Household Budget Survey 2004
* Household Heads

However, the analysis of household disposable income and consumption reveals that the volatility of income differs significantly across occupational groups. It is possible to interpret the ratio of the standard deviation to the mean of disposable income as a proxy measure for the volatility of income.[28] It is observed that this ratio is significantly greater for households from higher income groups such as employers and self-employed people. Moreover, the saving rates of employers and self-employed people are positive as expected. On the other hand, the ratio of the standard deviation to the mean of disposable income is the lowest for salary earners, but it is

[28] The TURKSTAT Household Budget Surveys do not follow the same individuals and households over time. Therefore, the survey data does not allow for the calculation on the volatility of income for individuals or households directly.

relatively high for wage earners and the saving rate is negative for wage earners (Table IV.5 and Table IV.6). It is observed that disposable income is more evenly and closely distributed within the salary earners group compared to the other occupational groups. Moreover, it is thought that employment and income conditions of salary earners are more stable compared to the other occupational groups.

The unequal distribution of household saving across occupational groups might help to explain why many previous empirical research studies concluded that the ratio of precautionary saving to total household saving is very small. Even though, the precautionary motive for saving exists, many households might find it difficult to accumulate financial wealth against future labour income uncertainty. Another problematic issue is the choice of relevant and effective proxy measures for future labour income uncertainty in the empirical analysis. Previous empirical papers used various proxy measures to reveal the empirical importance of precautionary saving. The volatility of income is the most common proxy variable for future labour income uncertainty in the empirical literature.[29] Guiso *et al.* (1992) and Lusardi (1997) use the growth of labour income as a proxy variable for future labour income uncertainty. However, in this empirical chapter, I will follow the example of Lusardi (1998) and Guariglia (2001), who interacted the subjective evaluation of the probability of becoming unemployed with the variance of labour income to develop a proxy variable for future labour income uncertainty.

The descriptive analysis of the household budget surveys strengthens the claim that different types of income risk are related to different sources of disposable income. The probability of becoming unemployed should be a more relevant concern

[29] See Chapter III for a more detailed discussion of proxy measures for future labour income uncertainty.

for working-class individuals rather than the volatility of income, which might be used to capture the impact of entrepreneurial income risk on household saving decisions. Thus, the empirical analysis is performed according to the clearly identified types of income risk, which depend on different sources of disposable income.

IV.3.B – The Impact of Labour Income Risk on Household Saving

The main focus of the econometric investigation process is *labour income risk*, which is associated with future labour income uncertainty in the economy. This type of income risk is especially important for working class individuals. Hence, it is expected that labour income risk will encourage working-class individuals to save a significant certain fraction of their income, which might be considered as a form of precautionary saving.

Three different proxy variables for labour income risk are developed in the following sub-section and used in the econometric analysis in order to explore the robustness of the empirical findings. The first proxy variable is developed using the probability of becoming unemployed, which is estimated by a probit model and the second proxy variable is based on the probability of job-loss situation, which is also estimated by a probit model. However, the probability of becoming unemployed is derived from a multinomial logit model for the third proxy variable for labour income risk. The multinomial logit model estimates the probability of being a working-class individual, the probability of being an entrepreneur and the probability of becoming unemployed jointly.

Unemployment is defined as the situation, when an individual is not working, but actively seeking a job during the survey month. Job-loss is the situation, where the individual was working in the previous year, but lost his/her job in the survey year. The Household Budget Survey 2003 includes 107,614 individual observations. Among these individuals 3,628 are considered as unemployed and 610 of them lost their jobs during the survey year 2003 according to the survey results. According to the Household Budget Survey 2003, only 3.37 % of total individuals are in the unemployed category and just 0.57 % of total individuals lost their jobs recently (Table IV.7).

Table IV.7 – Labour Market Developments

	Household Heads		*Individuals*	
	2003	**2004**	**2003**	**2004**
Job-Loss	301	112	610	233
Unemployed	619	204	3,628	1,206
Total	25,764	8,544	107,614	35,388

Source: TURKSTAT Household Budget Surveys

The Household Budget Survey 2004 includes 35,388 individual observations, which is much lower compared to the Household Budget Survey 2003. According to this survey, there are 1,206 unemployed individuals and 233 of these individuals lost their jobs in 2004. Unemployed individuals constitute 3.41 % of all individuals and only 0.66 % of total individuals lost their jobs recently (Table IV.7).

There are 25,764 household heads in the Household Budget Survey 2003. It is observed that 619 of them are within the unemployed category and 301 of them lost their jobs in 2003. According to the 2003 survey results, 2.40 % of total household heads are unemployed, but 1.17% of them lost their jobs during the survey year. On the other hand, there are 8,544 household heads in the Household Budget Survey

2004. It is observed that 204 of them are under the unemployed category and 112 of them lost their jobs during the survey year. According to the 2004 survey results, 2.39 % of total household heads are unemployed, but 1.31 % of them became unemployed during the survey year.

IV.3.B.a – The Approximation of Labour Income Risk

The development of an uncertainty measure to separate anticipated income changes from unexpected negative shocks to income such as a spell of unemployment is crucial to the analysis of the precautionary saving hypothesis. A suitable proxy variable to capture future labour income uncertainty and its implications for household saving decisions can be the subjective measurement of unemployment risk. The subjective measurement of unemployment risk by the individual can be improved by interacting it with the variance of labour income.

The approximation of labour income risk, which is based on the probability of becoming unemployed, is more appropriate to predict the share of precautionary saving in total household saving, since unemployment risk is a more relevant concern for working-class individuals as discussed previously. Moreover, this proxy measure is restricted to only labour income. There are different sources of disposable income such as rent income and interest income, which are available to the individual, even if the individual is unemployed and searching for a job at that moment. Thus, only the variance of labour income is interacted with the subjective measurement of unemployment risk to create the labour income risk variable. The individual has zero labour income with the probability (p) and with the probability ($1 - p$) the individual

gains his/her labour income (*I*), which does not include any other source of disposable income. The subscript (*i*) indicates that the regression is estimated over individuals. The sum of the two possibilities will be the expected labour income of the individual, which is shown in the equation (4.9). A similar proxy variable to capture future labour income uncertainty was previously used by Lusardi (1998) and Guariglia and Kim (2004).

$$U_i = p_i * (1 - p_i) * (I_i)^2 \tag{4.9}$$

The number of observations for individuals is far greater than the number of observations for households in the TURKSTAT Household Budget Surveys 2003 and 2004. It is expected that the greater number of observations will lead to precisely estimated regression coefficients for unemployment risk. Therefore, the dependent variable in the probit regression is selected as the unemployment dummy variables for individuals rather than household heads.[30]

The subjective evaluation of unemployment risk by the individuals themselves is not questioned in the TURKSTAT Household Budget Surveys. Therefore, the probability of becoming unemployed is estimated using a probit model, in which the dummy variable for being unemployed is regressed on age, age-squared and the dummy variables for gender and education (Table IV.8). The fitted values from the probit model are saved and used in the approximation of labour income risk. The

[30] A shortcoming of the TURKSTAT Household Budget Surveys is that there is not any information about the job potential and income prospects of the individual, if he/she is unemployed. It is possible to discover the business sector and employment status of the individual, only if he/she is currently employed. Moreover, it is not feasible to find whether the individual has social security coverage or not, if he/she is unemployed.

probability of becoming unemployed is interacted with the square of the logarithm of the individual labour income to generate the first labour income risk variable (*LIRI*).

Table IV.8 – Probit Models [(1)]

Pooled Sample Set, Cluster (Household)

Variables	**Prob. Of Being Unemployed**		**Prob. of Job-Loss**	
	Coef.	*Std. Err.*	*Coef.*	*Std. Err.*
Age	-0.012***	0.007	0.059*	0.011
Age-squared	0.000	0.000	-0.001*	0.000
Female	-0.086*	0.024	-0.196*	0.046
Married	-0.622*	0.030	-0.250*	0.049
Household Head	-0.372*	0.031	0.152*	0.050
Student	-0.239*	0.048	0.063	0.095
Extended Family	-0.078**	0.032	0.047	0.049
Literate	0.103	0.068	0.245**	0.106
Primary School	0.263*	0.058	0.106	0.086
Middle School	0.451*	0.066	0.174***	0.097
High School	0.688*	0.061	0.141	0.092
University	0.582*	0.064	0.003	0.103
Post-graduate	-0.184	0.230	-	-
No Health Insurance	0.329*	0.023	0.447*	0.036
Dummy 2004	0.007	0.023	0.080**	0.036
Constant	-0.927*	0.114	-3.190*	0.202
Number of obs.		44,992		44,992
Wald chi2 (15)		3,964.59		329.94
Prob. > chi2		0.000		0.000
Log pseudo-likelihood		-12,488.894		3,902.9348
Pseudo R^2		0.1718		0.0491

(Std. Err. adjusted for 27,192 clusters in household)

(1) The standard errors are estimated using the bootstrap method with 1,000 replications in the probit models.

*, ** and *** represent statistical significance levels of 1%, 5% and 10%, respectively.

The sample set is restricted to the individuals, who are of working age – between 12 and 60 – and who participate in the labour market voluntarily. Moreover, all of the retired individuals are excluded from the sample set, since their perception of unemployment risk and income loss would be significantly different than the young

and active individuals in the labour market. Therefore, 44,992 individual observations from the pooled data set for 2003 and 2004 are included in the probit model (Table IV.8).

Moreover, it is possible that individuals pool the risk of being unemployed and losing their labour income by living together with their family just as they share their income and consumption in the household. It is observed that average family size is greater than 4 and in most cases there is more than one income-earner in the family. At the extreme, the family size climbs to 23 people and the total number of income-earners reaches 13 individuals in one family. The average family size is higher in the rural regions compared to the urban regions, but it is observed that it is decreasing slowly over time. Family plays an important role over an individual's life and influences his/her consumption and saving decisions significantly. Therefore, it is necessary to consider this issue in the approximation of labour income risk. In this respect, the probit model for the probability of being unemployed is estimated by controlling for clustering within the family. The consideration of clustering within the household aims to attend to the unobserved heterogeneity issues, which stem from household characteristics.

The level of education is the main criterion, which affects the probability of becoming unemployed according to the results of the probit model. The relationship between the probability of becoming unemployed and the level of education is positive, contrary to the initial expectations. It is thought that the high unemployment rate of well-educated young individuals in Turkey is probably the main reason behind this unexpected econometric result. Higher education level increases the labour force participation rate of individuals, especially for women, but it cannot guarantee finding employment. Moreover, it is observed that the probability of becoming unemployed is

lower for women compared to men, but this result can also be an outcome of the low level of female labour force participation rate. The marginal effects for this probit model are presented in the following table (Table IV.9).[31]

The dummy variables for the level of education include all the educational attainment levels from being illiterate to having a postgraduate degree. The omitted dummy variable among the level of education categories in the probit model is being illiterate, which indicates that the individual does not know how to read and write (Table IV.8). Moreover, the omitted dummy variable category is the same in both of the probit models and the multinomial logit model in this sub-section.

It is possible that the individual had a job within the last year, but he/she lost his/her job during the survey year. Job-loss influences not only the economic situation of the family that the individual belongs to, but it also affects the psychology of all family members. In other words, all family members share this negative experience financially and emotionally. The probability of job-loss is estimated using a probit model from the pooled data set in a similar fashion (Table IV.8). The fitted values from the probit model are saved and used in the approximation of labour income risk. The probability of job-loss is interacted with the square of the logarithm of the individual labour income to generate the second approximation of labour income risk (*LIRII*). The approximation of a second labour income risk variable with the same approach will help to check the robustness of the econometric results in the following sections.

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[31] The difference in the value of the dependent variable, when the value of the explanatory variable (Z_k) increases from zero (0) to one (1) is the *marginal effect* of the discrete variable. However, the marginal effects depend on the value of the explanatory variable in the Probit and Multinomial Logit models. The marginal effects are calculated at the sample means of the explanatory variables in the Probit and Multinomial Logit models in this chapter.

Table IV.9 – Marginal Effects after Probit Models [1]

Variables	Prob. Of Being Unemployed		Prob. Of Job-Loss		
	dy/dx [2]	*Std. Err.*	*dy/dx* [2]	*Std. Err.*	*X*
Age	-0.002***	0.001	0.002*	0.000	33.641
Age-squared	0.000	0.000	0.000*	0.000	1253.050
Female	-0.011*	0.003	-0.007*	0.001	0.301
Married	-0.100*	0.006	-0.010*	0.002	0.693
Household Head	-0.049*	0.004	0.006*	0.002	0.469
Student	-0.027*	0.005	0.002	0.004	0.029
Extended Family	-0.010**	0.004	0.002	0.002	0.126
Literate	0.015	0.010	0.012**	0.006	0.047
Primary School	0.036*	0.008	0.004	0.003	0.479
Middle School	0.078*	0.014	0.007	0.005	0.101
High School	0.122*	0.013	0.006	0.004	0.219
University	0.108*	0.015	-	-	0.094
Post-graduate	-0.022	0.023	0.000	0.004	0.004
No Health Insurance	0.046*	0.003	0.018*	0.002	0.412
Dummy 2004	0.001	0.003	0.003**	0.001	0.246

(1) The omitted dummy variable categories are the same as in Table IV.8.

(2) dy/dx is for discrete change of dummy variable from 0 to 1.

*, ** and *** represent statistical significance levels of 1%, 5% and 10%, respectively.

The results of the probit model, which is estimated to predict the probability of job-loss, are not similar to the results from the probit model for the probability of becoming unemployment. The probability of job-loss is higher for young individuals, but it is observed that the relationship between the probability of job-loss and the level of education is not statistically significant in the second probit model (Table IV.8). These econometric results indicate that it might be difficult to find a job for well-educated individuals, but that they are less likely to lose their jobs compared to the rest of the work force. The marginal effects for this probit model are also presented in Table IV.9.

In the pooled sample of the TURKSTAT Household Budget Surveys, there are 125,414 individuals, who are at most 60 years old or younger and who are not already retired at home or abroad. Moreover, there are 49,432 individuals, who participate in

the labour market actively in the pooled sample. The total number of unemployed individuals is 4,834, which makes 9.8 % of the active work force. However, this high unemployment rate is actually consistent with the figures from the TURKSTAT Household Labour Market Surveys for 2003 and 2004. There are 32,521 wage-earners and salary-earners, who constitute the working-class individuals, whereas there are 12,077 entrepreneurs, who are composed of employers and the self-employed individuals, in the pooled sample.[32]

The labour market participation preferences of individuals are analysed with a multinomial logit model, which also controls for clustering within the household as previously discussed. It is observed that the multinomial logit model has higher explanatory power compared to the probit models and all the selected explanatory variables are statistically significant for all categories, apart from the dummy variable for 2004, which indicates that the labour market did not change significantly from one year to another. It is observed that young individuals are more likely to find jobs and also to lose their jobs, but as they get older their options in the labour market are more limited. Moreover, the level of education raises the possibility of employment either as a working-class individual or as an entrepreneur, but the unemployment rate is also higher among the well-educated individuals (Table IV.10).

The predicted probability of being unemployed from the multinomial logit model is acquired and utilised in the approximation of the third labour income risk variable (*LIRIII*) in the same fashion, which is considered as the main proxy variable in this chapter. The predicted probability of being unemployed is also interacted with

[32] See Chapter V for the empirical analysis of the role of entrepreneurs in the formation precautionary saving.

the square of the logarithm of the individual labour income, as shown in the equation (4.9).

Table IV.10 – Multinomial Logit Model for Labour Force Participation [(1) (2)]

Pooled Sample Set, Cluster (Household)

	Working Class		**Entrepreneur**		**Unemployed**	
	Coef.	*Std. Err.*	*Coef.*	*Std. Err.*	*Coef.*	*Std. Err.*
Age	0.324*	0.004	0.419*	0.010	0.333*	0.011
Age-squared	-0.004*	0.000	-0.005*	0.000	-0.005*	0.000
Female	-2.232*	0.032	-3.100*	0.056	-2.137*	0.050
Household Head	1.111*	0.037	1.949*	0.061	0.719*	0.060
Married	-0.700*	0.029	-0.267*	0.055	-1.939*	0.049
Student	-2.717*	0.049	-2.935*	0.143	-3.275*	0.094
Extended Family	0.421*	0.031	0.378*	0.057	0.260*	0.052
Literate	0.530*	0.052	0.549*	0.088	1.425*	0.144
Primary School	0.748*	0.041	0.657*	0.064	1.947*	0.140
Middle School	0.733*	0.050	0.445*	0.076	2.221*	0.157
High School	0.949*	0.047	0.313*	0.074	2.736*	0.148
University	2.712*	0.070	1.533*	0.105	4.252*	0.162
Post-graduate	3.286*	0.370	2.121*	0.455	3.216	6.970
No Health Insurance	0.600*	0.026	1.044*	0.037	1.119*	0.045
Dummy 2004	-0.005	0.026	-0.016	0.037	0.000	0.045
Constant	-4.833*	0.046	-9.235*	0.164	-7.340*	0.128
Number of obs.						125,414
Wald chi2 (45)						43,088.12
Prob. > chi2						0.000
Log pseudo-likelihood						68,742.08
Pseudo R^2						0.4209
(Std. Err. adjusted for 31,663 clusters in Household)						

No labour force participation is the base outcome in the multinomial logit model.

(1) The standard errors are estimated using the bootstrap method with 1,000 replications in the multinomial logit model.

(2) The omitted dummy variable categories are the same as in Table IV.8.

*, ** and ** represent statistical significance levels of 1%, 5% and 10%, respectively.

The direct econometric investigation of the impact of individual labour income risk on household saving is the one of main contributions of this empirical chapter. Previous research papers used the volatility of income as a proxy variable for future labour income uncertainty. However, the theoretical link between the volatility of income and future labour income uncertainty is rather weak. Moreover, the volatility

of income does not necessarily mean that future labour income prospects are bleak and/or uncertain. For instance, entrepreneurship income (e.g. *corporate profits*) of the employers and the self-employed individuals are highly volatile compared to wage-earners and salary-earners. Working-class individuals have a more stable income stream compared to them, but in fact they face a positive and significant probability of losing their jobs and their labour income. However, entrepreneurs could potentially lose their livelihood and also become unemployed via business failure.[33] The marginal effects of the multinomial logit model are presented in the Table IV.11.

Table IV.11 – Marginal Effects after Multinomial Logit Model (1)

Variables	Working Class		Entrepreneurship		Unemployed		
	dy/dx (2)	*Std. Err.*	*dy/dx* (2)	*Std. Err.*	*dy/dx* (2)	*Std. Err.*	*X*
Age	0.032*	0.001	0.017*	0.001	0.003*	0.001	33.641
Age-squared	0.000*	0.000	0.000*	0.000	0.000*	0.000	1253.05
Female	-0.294*	0.006	-0.125*	0.004	-0.021*	0.002	0.301
Household Head	0.078*	0.007	0.118*	0.006	-0.014*	0.003	0.469
Married	-0.047*	0.006	0.039*	0.004	-0.097*	0.005	0.693
Student	-0.459*	0.008	-0.093*	0.004	-0.047*	0.002	0.029
Extended Family	0.056*	0.007	0.005	0.006	-0.004***	0.002	0.126
Literate	0.001	0.015	0.002	0.009	0.076*	0.016	0.047
Primary School	0.050*	0.010	-0.001	0.006	0.075*	0.009	0.479
Middle School	-0.015	0.019	-0.032*	0.006	0.155*	0.023	0.101
High School	0.014	0.018	-0.060*	0.005	0.181*	0.021	0.219
University	0.097*	0.024	-0.080*	0.004	0.197*	0.026	0.094
Post-graduate	0.235	0.422	-0.068**	0.028	0.015	0.452	0.004
No Health Insurance	0.015*	0.005	0.058*	0.003	0.031*	0.003	0.412
Dummy 2004	0.000	0.005	-0.001	0.003	0.000	0.002	0.246

(1) The omitted dummy variable categories are the same as in Table IV.8.
(2) dy/dx is for discrete change of dummy variable from 0 to 1.
*, ** and *** represent statistical significance levels of 1%, 5% and 10%, respectively.

It is observed that the statistical properties of the labour income risk variables are similar to each other (Table IV.12). In particular, the first and the third labour

[33] See Chapter V for a detailed empirical analysis of this topic.

income risk variables (*LIRI* and *LIRIII*), which are both derived from the probability of becoming unemployed, have relatively closer mean and standard deviation values.

Table IV.12 – Summary Statistics of the Labour Income Risk Variables

	Pooled Sample				
	Obs.	*Mean*	*Std. Dev*	*Min*	*Max*
Probit Model					
Prob. of Becoming Unemployed	143,002	0.110	0.093	0.001	0.457
Prob. of Job-loss	143,002	0.012	0.011	0.000	0.088
Labour Income Risk I (*LIRI*)	22,520	4.501	4.079	0.091	22.573
Labour Income Risk II (*LIRII*)	22,520	1.028	0.694	0.001	5.271
Multinomial Logit Model					
Prob. of Unemployment	143,002	0.034	0.065	0.000	0.382
Labour Income Risk III (*LIRIII*)	22,520	3.573	3.536	0.000	21.723

Individual labour income (I_i) is interacted with the probability of becoming unemployed (p_i) for individuals in order to approximate labour income risk (U_i), as shown in equation (4.9). The probability of becoming unemployed is estimated using both probit and multinomial logit models to explore the robustness of the empirical findings (Table IV.12). Although, the approximation of labour income risk is realised using observations for individuals, only the observations for household heads are used in the econometric investigation process. It is possible to observe disposable income and its sources at the individual level, but consumption and saving figures are only available at the household level in the TURKSTAT Household Budget Surveys.[34] Moreover, labour income risk of the household head is considered as a suitable proxy variable for future labour income uncertainty of the entire family. Therefore, only the observations for household heads are introduced into the household saving equations as the labour income risk variable in the following sub-sections.

[34] See the Appendix for the definitions of the main economic variables.

IV.3.B.b – The Estimation of the Permanent Income Variable

Individual labour income is composed of annual wage and salary payments to individuals in return for their work either in the private sector or in the public sector. It includes income in-cash and income in-kind and also additional contributions such as premiums. It is observed that the average labour income level is lower than the average disposable income in the pooled sample. Moreover, the standard deviation of labour income is smaller than that of total disposable income and entrepreneurship income as expected. However, the number of labour income earners is significantly higher than the number of entrepreneurial income earners, which raises the overall importance of labour income in the economy (Table IV.13).

Only a small minority of individuals enjoy interest income according to the TURKSTAT Household Budget Surveys. This is not a surprising observation, since only a small percentage of the people have positive savings in the pooled sample. Moreover, interest income is also unequally distributed among the individuals, who have interest income. It is thought that the majority of the individuals simply do not have positive savings and therefore, they cannot benefit from high real interest rates (Table IV.13).

Table IV.13 – Sources of Individual Disposable Income
(*Individual level, YTL, 2003 prices*)

	Pooled Sample				
	Obs.	*Mean*	*Std. Dev*	*Min*	*Max*
Disposable Income	49,536	6,171.0	8,230.1	0.0	381,560
Labour Income	22,520	5,451.9	5,194.6	6.9	154,000
Entrepreneurship Income	6,153	10,371.1	14,991.1	0.0	378,350
Interest Income	4,394	1,375.5	5,566.3	5.5	260,000

Source: TURKSTAT Household Budget Surveys 2003 and 2004

It is necessary to note that the analysis of the sources of individual disposable income, which is presented in Table IV.13, is dependent on the information provided by the households, who participated in the preparation of the TURKSTAT Household Budget Surveys. It is mentioned in the previous empirical literature that households can underreport their disposable income and disguise the sources of their disposable income for various reasons (Deaton, 1997). For instance, households may hide their true disposable income level to benefit from free public health care services, which is actually common in Turkey.

Moreover, the preparation of the TURKSTAT Household Budget Surveys has been seriously criticised, since the surveys provide limited information about households' financial assets. It is argued that the small share of interest income in total disposable income is because of the failure of the surveys to account for households' financial assets (Yükseler and Türkan, 2008). Therefore, it might be a good idea in the future to perform household budget surveys with a smaller sample size, but with more emphasis on households' financial wealth accumulation. The preparation of such a panel-data set will support empirical research significantly. For instance, interest income is considered as a promising way of determining whether individuals are liquidity constrained or not.

The most significant step of the empirical analysis is the estimation of the permanent component of individual disposable income. However, there are important difficulties in the estimation of the permanent component of income. First, the TURKSTAT Household Budget Surveys do not have a panel dimension, which limits the scope of the empirical analysis. Second, there are only 49,536 individuals out of 143,002 individuals in the pooled sample, who have a positive amount of disposable income from different sources. There are many individuals that do not participate in

the labour market, even though they are of the working age. Therefore, a significant proportion of the individuals in society do not have any disposable income in the current period.

Moreover, some of the individuals are classified as actively working, but they do not have any labour income such as unpaid family workers. In the sample, there are 44,598 individuals, who are categorised as actively working, but only 34,994 of them actually have a positive amount of disposable income. It is observed that 9,600 family workers out of a group of 9,997 individuals do not have any disposable income, which is the main difference between working and earning individuals. However, this observation also points out that a substantial part of society – 14,542 individuals, which make up 10.2 % of the pooled sample – derive their disposable income in the current period from alternative sources other than the labour market in Turkey.

The presence of *censored* observations in the sample creates obstacles in the estimation of the permanent component of income. This situation might also lead to a sample-selection bias in the estimation process. In order to overcome this problem, the permanent component of income is developed by analysing individual disposable income with the Heckman two-step selection model (Heckman, 1979). The first stage of the model is a probit model and the dependent variable is a dummy variable, which equals one, if the individual has positive income. Thus, the selection criterion in the first stage of the model is observing a positive income level for individuals. In the second stage of the model, the logarithmic values of individual disposable income are regressed on age, age-squared and the dummy variables for gender, education level, occupation, employment status and sector distribution of the working individuals and finally, a time-dummy variable for 2004. The Heckman two-step selection model is

estimated for individuals, who are between the ages of 15 and 60. There are 41,511 uncensored observations and 48,534 censored observations in the total sample of 90,045 individuals. The fitted values from the Heckman two-step selection model are saved and used as the permanent component of income (Table IV.14).[35]

Table IV.14 – The Estimation of Individual Permanent Income (1)

Heckman selection model – two-step estimates (regression model with sample selection)

First Stage – Probit Model

Explanatory Variables	**Positive Income**					
	Coef.	*Std. Err.*	*z*	*P>|z|*	*[95% Conf. Interval]*	
Age	0.082*	0.004	18.900	0.000	0.074	0.091
Age-squared	-0.001*	0.000	-14.620	0.000	-0.001	-0.001
Female	-0.383*	0.018	-21.440	0.000	-0.417	-0.348
Married	-0.449*	0.022	-20.780	0.000	-0.491	-0.406
Household Head	2.796*	0.030	93.790	0.000	2.738	2.855
Student	-0.055**	0.026	-2.090	0.037	-0.107	-0.003
Extended Family	0.257*	0.020	12.860	0.000	0.218	0.297
Literate	0.212*	0.039	5.410	0.000	0.135	0.289
Primary School	0.257*	0.030	8.720	0.000	0.200	0.315
Middle School	0.602*	0.036	16.790	0.000	0.531	0.672
High School	0.730*	0.033	22.180	0.000	0.665	0.794
University	1.375*	0.038	36.530	0.000	1.301	1.449
Post-graduate	1.755*	0.196	8.940	0.000	1.371	2.140
Working Individual	1.676*	0.016	103.960	0.000	1.644	1.707
No Health Insurance	-0.511*	0.016	-31.550	0.000	-0.542	-0.479
Dummy 2004	0.107*	0.015	7.130	0.000	0.077	0.136
Constant	-2.955*	0.077	-38.550	0.000	-3.105	-2.804

[35] See Chapter IV – Section II.

Table IV.14 – The Estimation of Individual Permanent Income (cont'd)

Second Stage – OLS Regression

Explanatory Variables	Log of Individual Disposable Income					
	Coef.	*Std. Err.*	*z*	*P>|z|*	*[95% Conf. Interval]*	
Age	0.058*	0.003	19.740	0.000	0.052	0.064
Age-squared	-0.001*	0.000	-16.670	0.000	-0.001	-0.001
Female	0.004	0.015	0.250	0.804	-0.025	0.033
Married	-0.081*	0.014	-5.900	0.000	-0.107	-0.054
Household Head	0.409*	0.019	21.510	0.000	0.372	0.446
Student	-0.142*	0.029	-4.890	0.000	-0.198	-0.085
Extended Family	0.238*	0.019	12.410	0.000	0.201	0.276
Literate	0.135*	0.033	4.090	0.000	0.071	0.200
Primary School	0.269*	0.024	11.030	0.000	0.221	0.317
Middle School	0.374*	0.026	14.470	0.000	0.324	0.425
High School	0.519*	0.026	20.320	0.000	0.469	0.569
University	0.761*	0.028	27.070	0.000	0.706	0.816
Post-graduate	1.342*	0.056	23.950	0.000	1.232	1.452
Industry	0.162*	0.031	5.240	0.000	0.101	0.223
Construction	0.234*	0.030	7.830	0.000	0.175	0.292
Services	0.122*	0.030	4.030	0.000	0.063	0.181
Manager	0.357*	0.020	18.240	0.000	0.318	0.395
Professional	0.206*	0.018	11.510	0.000	0.171	0.241
Sales Personal	0.059*	0.015	3.950	0.000	0.030	0.089
Farmer	0.131*	0.034	3.880	0.000	0.065	0.198
Skilled Worker	0.146*	0.013	11.080	0.000	0.120	0.172
Salary Earner	0.749*	0.037	20.000	0.000	0.675	0.822
Wage Earner	0.372*	0.037	10.100	0.000	0.300	0.444
Employer	1.339*	0.043	31.440	0.000	1.256	1.423
Self-Employed	0.915*	0.041	22.150	0.000	0.834	0.996
Apprentice	-0.046	0.210	-0.220	0.825	-0.457	0.365
Private Sector	-0.179*	0.012	-14.560	0.000	-0.204	-0.155
SOE [(2)]	0.283*	0.022	12.740	0.000	0.240	0.327
No Social Security	-0.555*	0.016	-34.720	0.000	-0.586	-0.524
No Health Insurance	0.164*	0.017	9.770	0.000	0.131	0.197
Dummy 2004	0.086*	0.008	10.330	0.000	0.070	0.103
Retired	0.746*	0.017	43.250	0.000	0.712	0.780
Retired Abroad	1.093*	0.142	7.690	0.000	0.814	1.371
Constant	5.847*	0.061	95.840	0.000	5.728	5.967

Table IV.14 – The Estimation of Individual Permanent Income (cont'd)

Inverse Mills Ratio	*Coef.*	*Std. Err.*	*z*	*P>|z|*	*[95% Conf. Interval]*	
lambda	-0.270*	0.019	-14.130	0.000	-0.307	-0.232
rho	-0.365					
sigma	0.739					
lambda	-0.270	0.015				
Number of obs.						90,045
Censored obs.						48,534
Uncensored obs.						41,511
Wald chi2(48)						24,369.69
Prob. > chi2						0.000

(1) The standard errors are estimated using the bootstrap method with 1,000 replications in the Heckman two-step selection model.

(2) State-owned enterprises.

* and ** represent statistical significance levels of 1% and 5%, respectively.

Moreover, it is necessary to have at least one variable in the first stage probit model, which is not included in the second stage OLS regression in the Heckman two-step selection model (Puhani, 2000). The particular variable that is included in the first stage probit model, but excluded from the second stage OLS regression is essentially an instrument. The dummy variable for working individuals is considered as a valid instrument due to its direct and strong relationship with having positive income. For this reason, a dummy variable for *working individuals* is introduced into first stage the probit model, which is not included in the second stage OLS regression. It is observed that the regression coefficient of this dummy variable in the probit model is positive and statistically significant as expected (Table IV.14).

The second stage of the Heckman two-step selection model is actually quite similar to a Mincerian earnings function, which explores the relationship between the level of income and the human capital of the individual. It is observed that the level of education raises both the probability of having positive income and the level of current disposable income of the individual. Employment prospects, which are dependant on the level of education as well as the social environment, determine the

level of income, job-security and the social security coverage of the individual and his/her family. Individual permanent income plays a key role in household saving decisions, the choice of occupation and the purchase of private health insurance. Consequently, education emerges as the key determinant of social and economic transformation for the individuals.

It is observed that employees from the construction, industry and services sectors have a greater amount of disposable income compared to the individuals from the agricultural sector. Moreover, it is observed that employers and self-employed individuals have significantly greater disposable income compared to the rest of the individuals in the employed status category as expected. The time-dummy variable for 2004 is positive and statistically significant. It may be the case that the strong growth performance of the economy during this time period raised individuals' disposable income. The only statistically insignificant regression coefficients in the model belong to the female and apprentice categories, which might stem from their positions in the labour market. Apprentices are considered as the most inexperienced and the least valuable workers in the labour market: Moreover, there are only 37 observations for apprentices in the pooled sample. Finally, the regression coefficient of the Inverse Mills Ratio (*lambda*) is statistically significant, which confirms the application of the Heckman two-stage least squares estimation technique, i.e. the presence of sample selection bias without this correction (Table VI.14).

The permanent component of individual disposable income is predicted from the Heckman two-step selection model only for individuals, who participate in the labour market and gain labour income and/or for individuals, who do not participate in the labour market, but still have disposable income from other sources. There are 62,775 individuals, who satisfy at least one of these two criteria in the pooled sample

set. Moreover, household permanent income is the sum of individual permanent income of members of a single family, which is introduced to the household saving equations in the next sub-section and the following empirical chapters.

IV.3.B.c – Household Saving

Traditionally, the family is the most important aspect of social life, which makes it the focus of empirical research on household consumption and saving behaviour as well. For this reason, household saving is the dependent variable in the econometric investigation process. From a theoretical point of view, there are several different definitions of household saving. The best approach is to separate saving into different categories and analyse household saving accordingly. Expenditures on durable goods, which are one of the main categories of household consumption, can be considered as part of household investment. Therefore, expenditures on durable goods can also be included in household saving.

There are two different definitions of household saving that will be analysed in this empirical chapter. The first definition (*Household Saving I or SAVI*) is merely the difference between household disposable income and household consumption expenditures. The second definition (*Household Saving II or SAVII*) is the difference between household disposable income and household consumption expenditures, but in this case, it also includes expenditures on durable goods from consumption, since durable goods are generally considered as part of household saving in the economics literature (Romer, 2001). It is calculated that around 35.2 % of total households have negative savings with respect to the first definition of household saving (*SAVI*) in the

pooled data set, but this ratio drops to 30.8 % if the second definition of household saving (*SAVII*) is chosen. Paxson (1992) and Carroll *et al.* (2003) followed a similar approach in the analysis of household saving previously in the empirical literature.

The main economic variables, which are used in the estimated household saving regressions, are presented in Table IV.15. It is observed that the household saving level increases significantly in both 2003 and 2004, when expenditures on durable goods are considered as part of household saving. The household saving rate increases from 17 % to 22.9 % for the pooled data set, when expenditures on durable goods are included in household saving rather than household consumption.

Table IV.15 – Household Disposable Income, Consumption and Saving
(*Household level, YTL, 2003 prices*)

	Pooled Sample				
	Obs.	*Mean*	*Std. Dev*	*Min*	*Max*
Disposable Income	34,308	10,442.2	11,469.4	0.0	412,891.5
Consumption I	34,308	8,665.6	7,681.5	180.0	187,109.0
Consumption II	34,308	8,048.8	6,431.9	180.0	174,477.1
Saving I	34,308	1,776.6	8,885.3	-119,967.5	399,010.8
Saving II	34,308	2,393.4	8,827.7	-104,487.5	399,010.8

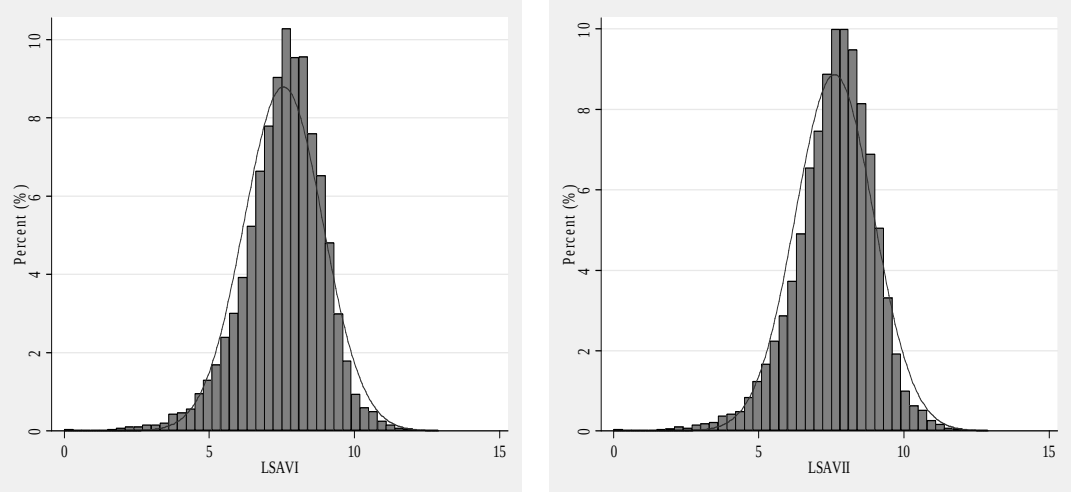
Source: TURKSTAT Household Budget Surveys 2003 and 2004

The main economic variable of the empirical research is household saving. For this reason, it is necessary to comment briefly on the potential problems that might emerge in the empirical analysis. First of all, household saving is calculated as the difference between household disposable income and consumption expenditures. Thus, any measurement error related to all the economic variables will be directly reflected in household saving. Second, disposable income is unequally distributed among individuals in society. As a result, household saving is also unevenly distributed among families in society. Working class individuals, who face a greater level of unemployment risk, have a lower saving ratio compared to entrepreneurs,

who have a significantly higher saving ratio. This situation might lead to the underestimation of the share of precautionary saving in total household saving.

Moreover, two different logarithmic transformations of household saving are used in the econometric investigation process. First, the natural logarithms of *SAVI* and *SAVII* are taken, which results in *LSAVI* and *LSAVII*, respectively. It is observed that the distributions of both *LSAVI* and *LSAVII* are close to the normal distribution. This is a common approach in the previous empirical literature, but this approach leads to the loss of a significant number of observations, if the values of household saving are negative. As a result, household saving becomes a *censored variable* from left, since its negative values cannot be observed and analysed in the econometric regressions. Thus, *LSAVI* and *LSAVII* are analysed with the pooled Tobit models in the econometric investigation process in order to overcome this problem (Figure IV.1).

Figure IV.1 – Histograms of *LSAVI* and *LSAVII*

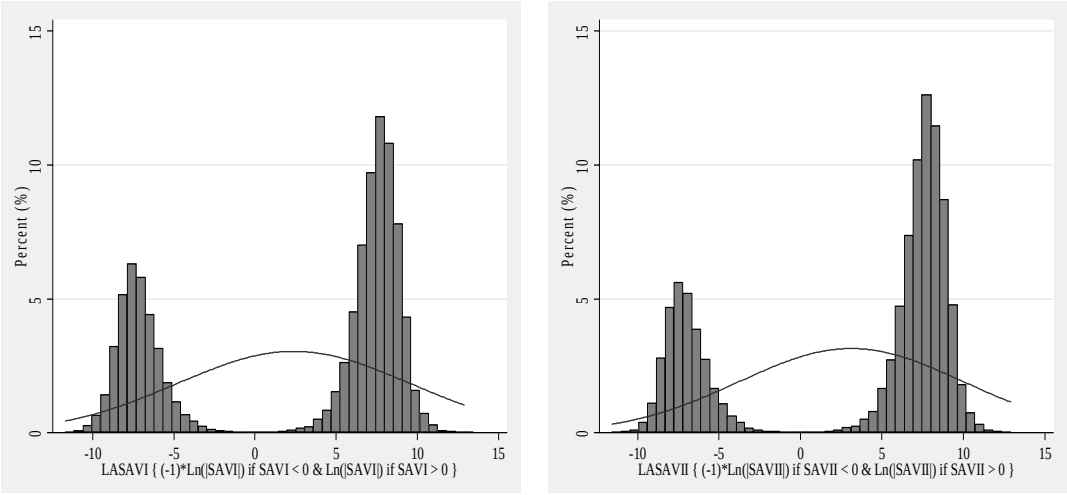


Second, the natural logarithms of absolute values of *SAVI* and *SAVII* are taken. Afterwards, negative values of household saving are re-assigned by multiplying

LASAVI and *LASAVII* with minus one (*-1*), if the observations of *SAVI* and *SAVII* are negative in the first place. This approach helps to save all observations of household saving whether they are negative or positive for each household. Thus, it is possible to use *LASAVI* and *LASAVII*, which emerge as a result of this transformation process, as the dependent variables in the pooled OLS and Tobit regressions and also in the Heckman two-step selection models (Figure IV.2).

Moreover, if the initial values of *SAVI* and *SAVII* are between zero and one, then these observations are set to zero after the logarithmic transformation process of both *LSAVI* and *LSAVII* and also *LASAVI* and *LASAVII*. Thus, these observations are saved and included in the empirical analysis with this approach.

Figure IV.2 – Histograms of *LASAVI* and *LASAVII*



IV.3.B.d – Housing Wealth

The TURKSTAT Household Budget Surveys provide information about the financial values of all types of land and property owned by households. Land and

property ownership are analysed in three different categories with respect to the relevant economic activities.

i. The first category includes all types of land and property ownership. *Real estate* is composed of houses in all qualities, holiday homes, apartment flats, all types of agricultural land, land used for purposes other than agriculture, hotel ownership and other properties.

ii. The second category is *agricultural land*, which is composed of arable fields, greenhouses, conservatories and orchards.

iii. The third category is *housing wealth*, which is composed of only houses, apartment flats, holiday homes and other properties. Agricultural land and hotel ownership are not included in the third category, since it is reasonable to consider ownership of these properties as a form of entrepreneurship. For this reason, it might not be suitable to introduce them to the analysis of household consumption and saving behaviour.

It is thought that housing wealth is the main form of accumulating wealth for many households in Turkey. It is observed that more than 70 % of families own the house that they are currently living in. The high percentage of house ownership in Turkey creates an idea about household behaviour, but it is necessary to keep in mind that the distribution of housing wealth is also uneven across society parallel to household disposable income and household saving. Families might own their houses, but the values of houses change from one neighbourhood to another significantly. The importance of housing wealth can be clearly observed, when its size is compared with household disposable income. However, it is observed that the financial values of

agricultural land are limited compared to the sum of all types of land and property ownership (Table IV.16).

Table IV.16 – Housing Wealth
(*Household level, YTL, 2003 prices*)

	Pooled Sample				
	Obs.	*Mean*	*Std. Dev*	*Min*	*Max*
Real Estate	34,308	33,896.4	86,340.0	0.0	6,070,000.0
Agricultural Land	34,308	6,745.4	36,031.5	0.0	2,500,000.0
Housing Wealth	34,308	27,048.7	73,466.8	0.0	6,070,000.0

Source: TURKSTAT Household Budget Surveys 2003 and 2004

Thus, the logarithmic transformation of real estate ownership is introduced to the estimated household saving regressions for several reasons.

- Housing wealth is the major component of wealth for many households
- Rental income makes a substantial contribution to family income.
- Home ownership is a criterion to identify financially constrained families.
- Home ownership will influence household saving decisions significantly.

However, there are a significant number of missing observations in all housing wealth categories, since many families live in rented apartment flats and also only a minority of households own agricultural land today in Turkey. Therefore, the missing values in housing wealth categories are set to zero, when their logarithmic values are taken in the empirical analysis.

Several empirical papers on developed countries reached interesting results, when the empirical analysis was centred on housing wealth as well as developments in the financial markets. Housing wealth has become significantly more liquid with the improvement of the financial markets. Households are able to borrow significant amounts of credit from the financial institutions using their housing investment as

collateral. As a result of these developments, the necessity to keep a certain fraction of household wealth in the form of financial assets might decline especially in developed countries. Thus, it is reasonable to argue that households invest in housing with many considerations in their minds, where the reasons might also include the precautionary motive for saving (Carroll *et al.*, 2003).

IV.3.C – Econometric Results

All the main economic variables such as labour income risk and household permanent income are estimated using auxiliary regressions in the previous stages of the empirical analysis. The advantage of this approach is that it is a two-stage least squares regression process (*2SLS*) that aims to overcome the identification issue in the simultaneous-equations models. This approach helps to eliminate correlation between the error terms and the explanatory variables, which might emerge in the estimated household saving equations. Thus, the regression coefficients from the pooled OLS regressions and Tobit models are unbiased and reliable. However, the standards errors of the pooled OLS regressions and Tobit models must be corrected in the econometric analysis due to the inclusion of labour income risk and permanent income, which are generated variables. Therefore, the standard errors of all of the estimated regressions are calculated using the nonparametric bootstrap method with 1,000 replications in this and the following empirical chapters.

Moreover, the main economic variables such as household permanent income and the monetary values of real estate ownership are introduced into the household saving equations after their logarithms are taken. At the same time, it is suggested that

income smoothing might be an alternative method of consumption smoothing for many households instead of keeping financial assets as a form of precautionary saving. Households might search for additional income sources to smooth their income pattern, if it is not possible for them to raise their saving level. The two most popular choices in developing countries are holding a second-job and increasing the number of income-earners in the family. For instance, if both spouses are working in the family, it will not only increase household income, but it will also raise the sources of income, which will reduce the amount of uncertainty about future income prospects of the family. Therefore, the household saving regressions incorporates alternative income-smoothing strategies, which might be implemented by households in Turkey. For this purpose, the labour income risk variables are interacted with the dummy variables for the household head's *additional employment* situation and also for having *multiple income-earners* in the family. The interaction terms are introduced to the household saving regressions along with labour income risk and other economic and social variables.

Two different estimation methods, pooled OLS regressions and pooled Tobit models, are employed in the econometric analysis for two main reasons. First, it is necessary to use different estimation methods in the econometric investigation process to explore the robustness of the empirical findings. Secondly and more importantly, there are two different dependent variable categories in the empirical analysis, which requires the employment of two different estimation methods. It is feasible to estimate the logarithmic transformations of the absolute values of household saving (*LASAVI* and *LASAVII*), which is explained in the previous sub-section, using the pooled OLS regressions. However, the direct logarithmic transformation of household saving leads to censored variables from left (*LSAVI* and *LSAVII*), since the negative observations

of household saving are lost during the logarithmic transformation process, which is discussed in the previous sub-section. Therefore, it is necessary to estimate these dependent variables (*LSAVI* and *LSAVII*) with the pooled Tobit models. As a result, the econometric results of the pooled OLS regressions are presented in Table IV.17, Table IV.18 and Table IV.19, whereas the econometric results of the pooled Tobit models are presented in Table IV.20, Table IV.21 and Table IV.22 in this sub-section.

It is observed that the regression coefficients of almost all of the explanatory variables are statistically significant in the estimated household saving regressions (Table IV.17). Moreover, the econometric results from the pooled OLS regressions are quite similar for both definitions of household saving (*LASAVI* and *LASAVII*). The regression coefficients of household permanent income and real estate ownership have the expected positive signs and they are statistically significant in all household saving regressions. However, the OLS regression on household saving, which also includes expenditures on durable goods (*LASAVII*), has higher explanatory power compared to the former definition of household saving (*LASAVI*). Moreover, it is observed that the regression coefficients have greater magnitudes in the regression of the second definition of household saving (Table IV.17).

The econometric results from the pooled OLS regressions are quite interesting. The first approximation of labour income risk variable (*LIRI*), which is derived from the probability of unemployment, has the expected positive sign and it is statistically significant at 1 % significance level in all household saving regressions. Hence, the initial econometric results support the precautionary saving hypothesis, which suggests that labour income risk leads to the postponement of household consumption expenditures and to the rise in household saving (Table IV.17).

Table IV.17 – The Pooled OLS Regression of Household Saving on LIRI [(1)]

Pooled OLS Regressions

	LASAVI	**LASAVII**	**LASAVI**	**LASAVII**	**LASAVI**	**LASAVII**
	Coefficient	*Coefficient*	*Coefficient*	*Coefficient*	*Coefficient*	*Coefficient*
Explanatory Variables	*Std. Err.*	*Std. Err.*	*Std. Err.*	*Std. Err.*	*Std. Err.*	*Std. Err.*
Household Permanent Income	0.124*	0.129*	0.056*	0.057*	0.057*	0.057*
	0.011	0.011	0.015	0.014	0.015	0.014
Real Estate	0.164*	0.183*	0.167*	0.185*	0.167*	0.185*
	0.013	0.012	0.013	0.012	0.012	0.012
Labour Income Risk (*LIRI*)	0.576*	0.656*	0.592*	0.673*	0.585*	0.669*
	0.046	0.045	0.046	0.045	0.051	0.049
Children < 18	1.834**	2.044*	1.788**	1.994*	1.742**	1.922*
	0.861	0.754	0.864	0.752	0.842	0.748
Children > 18	1.689***	1.886**	1.700***	1.899**	1.649***	1.818**
	0.879	0.762	0.883	0.759	0.860	0.755
Nuclear Family	2.595*	2.827*	2.491*	2.716*	2.448*	2.649*
	0.871	0.791	0.875	0.788	0.873	0.785
Traditional Family	2.728*	3.067*	2.746*	3.086*	2.692*	3.005*
	0.984	0.875	0.989	0.874	0.996	0.872
Single Parent Family	1.712***	1.243	1.694***	1.222	1.649***	1.136
	0.936	0.855	0.940	0.850	0.961	0.861
No Health Insurance	-1.618*	-2.032*	-1.678*	-2.097*	-1.678*	-2.097*
	0.239	0.238	0.240	0.237	0.240	0.237
No Social Security	-0.964*	-1.002*	-0.975*	-1.015*	-0.976*	-1.016*
	0.214	0.208	0.215	0.207	0.210	0.208
Additional Employment	-	-	-0.263	-0.220	-0.824***	-0.936***
			0.262	0.251	0.490	0.511
Multiple Income-Earner	-	-	1.337*	1.414*	1.380*	1.503*
			0.204	0.181	0.288	0.278
LIRI-AE	-	-	-	-	0.278	0.354***
					0.213	0.214
LIRI-MIE	-	-	-	-	-0.019	-0.039
					0.099	0.095
Rural Region	-0.401*	-0.322**	-0.434*	-0.364**	-0.426*	-0.355**
	0.157	0.156	0.158	0.156	0.166	0.156
Dummy 2004	-0.260***	0.048	-0.258***	0.050	-0.258***	0.049
	0.139	0.129	0.139	0.128	0.140	0.128
Constant	-3.273*	-2.952*	-2.735*	-2.383*	-2.679*	-2.306*
	0.926	0.818	0.933	0.821	0.906	0.816
Number of obs.	13,703	13,703	13,703	13,703	13,703	13,703
R-squared	0.055	0.074	0.058	0.077	0.058	0.078
R-squared	0.054	0.073	0.057	0.077	0.057	0.077
Wald chi2	Wald chi2(12)		Wald chi2(14)		Wald chi2(16)	
	855.31	1,138.01	938.79	1,219.14	897.86	1238.55
Prob. > chi2	0.000	0.000	0.000	0.000	0.000	0.000

(1) The standard errors are estimated using the bootstrap method with 1,000 replications in the pooled OLS regressions.

*, ** and *** represent statistical significance levels of 1%, 5% and 10%, respectively.

It is observed that if the household head does not have social security or health insurance coverage, then this situation has a negative impact on household saving. It is reasonable to suggest that the family is forced to finance their health expenditures on their own under these circumstances. Thus, the lack of social security coverage and health insurance coverage might become an obstacle for the family against the build up of financial assets (Table IV.17).

However, it is observed that the regression coefficients of the interaction terms are not statistically significant, contrary to expectations. Moreover, the dummy variable for additional employment is also statistically insignificant, but the regression coefficient of the dummy variable for having multiple income-earners in the family has the expected positive sign and is statistically significant in all household saving regressions (Table IV.17).

The econometric results from the pooled OLS regression of household saving (*LASAVI* and *LASAVII*) for the second approximation of labour income risk (*LIRII*), which is based on the probability of job-loss, show differences compared to the first set of econometric results, especially in the magnitudes of the regression coefficients (Table V.18). Both household permanent income and real estate ownership have positive and statistically significant regression coefficients in all household saving regressions, but the regression coefficients of the dummy variables for children in the family and family characteristics are not statistically significant unlike the previous econometric results. However, the rest of the dummy variables for the lack of social security and health insurance coverage and also the presence of multiple income-earners in the family are statistically significant in the estimated household saving regressions as before.

Table IV.18 – The Pooled OLS Regression of Household Saving on LIRII [(1)]

Pooled OLS Regression

	LASAVI	**LASAVII**	**LASAVI**	**LASAVII**	**LASAVI**	**LASAVII**
	Coefficient	*Coefficient*	*Coefficient*	*Coefficient*	*Coefficient*	*Coefficient*
Explanatory Variables	*Std. Err.*	*Std. Err.*	*Std. Err.*	*Std. Err.*	*Std. Err.*	*Std. Err.*
Household Permanent Income	0.135*	0.142*	0.069*	0.071*	0.069*	0.072*
	0.011	0.011	0.015	0.014	0.014	0.014
Real Estate	0.165*	0.183*	0.167*	0.186*	0.167*	0.186*
	0.013	0.012	0.012	0.012	0.012	0.012
Labour Income Risk (*LIRII*)	1.745*	2.059*	1.799*	2.119*	1.942*	2.283*
	0.156	0.148	0.152	0.147	0.164	0.155
Children < 18	-0.431	-0.506	-0.535	-0.619	-0.584	-0.665
	0.813	0.752	0.806	0.732	0.821	0.754
Children > 18	-0.332	-0.368	-0.371	-0.411	-0.441	-0.477
	0.832	0.769	0.822	0.738	0.840	0.770
Nuclear Family	0.735	0.754	0.585	0.593	0.560	0.571
	0.850	0.788	0.846	0.766	0.858	0.790
Traditional Family	0.783	0.889	0.751	0.854	0.710	0.819
	0.970	0.875	0.964	0.849	0.978	0.879
Single Parent Family	1.846**	1.416	1.834**	1.401***	1.781***	1.346
	0.965	0.897	0.941	0.844	0.970	0.898
No Health Insurance	-3.396*	-4.165*	-3.515*	-4.294*	-3.463*	-4.237*
	0.331	0.319	0.328	0.314	0.331	0.316
No Social Security	-1.102*	-1.140*	-1.115*	-1.154*	-1.159*	-1.201*
	0.214	0.209	0.223	0.205	0.214	0.209
Additional Employment	-	-	-0.263	-0.213	-0.509	-0.114
			0.265	0.252	0.506	0.472
Multiple Income-Earner	-	-	1.322*	1.402*	2.038*	2.144*
			0.197	0.182	0.289	0.295
LIRI-AE	-	-	-	-	0.268	-0.050
					0.385	0.371
LIRI-MIE	-	-	-	-	-0.708*	-0.729*
					0.214	0.208
Rural Region	-0.455*	-0.380**	-0.489*	-0.424*	-0.480*	-0.410*
	0.165	0.150	0.164	0.159	0.166	0.152
Dummy 2004	-0.619*	-0.377*	-0.627*	-0.388*	-0.626*	-0.385*
	0.146	0.138	0.144	0.137	0.145	0.137
Constant	-1.348	-0.866	-0.774	-0.256	-0.894	-0.406
	0.864	0.800	0.858	0.779	0.880	0.805
Number of obs.	13,703	13,703	13,703	13,703	13,703	13,703
R-squared	0.052	0.071	0.055	0.075	0.056	0.076
Adj. R-squared	0.051	0.070	0.055	0.074	0.055	0.075
Wald chi2	Wald chi2(12)		Wald chi2(14)		Wald chi2(16)	
	813.6	1,208.58	869.87	1100.55	891.38	1,318.45
Prob. > chi2	0.000	0.000	0.000	0.000	0.000	0.000

(1) The standard errors are estimated using the bootstrap method with 1,000 replications in the pooled OLS regressions.

*, ** and *** represent statistical significance levels of 1%, 5% and 10%, respectively.

The second approximation of labour income risk (*LIRII*) also has the expected positive sign and is statistically significant in all household saving regressions, but its magnitude is greater compared to the previous econometric results. The econometric results are in favour of the precautionary saving hypothesis and confirm the initial findings of the first set of econometric results (Table V.18).

Finally, the econometric results from the pooled OLS regression of household saving (*LASAVI* and *LASAVII*) on the third approximation of labour income risk (*LIRIII*) are quite similar to the first set of econometric results (Table V.19). The third approximation of labour income risk (*LIRIII*) is developed by using the probability of unemployment, which is measured by the multinomial logit model, is considered as the most reliable measurement of labour income risk. Therefore, the econometric results from the final set of household saving regressions are more important than the previous econometric results. It is necessary to point out that the econometric results are similar to the previous econometric results in every aspect such as the magnitudes of the regression coefficients and the statistical significance levels of the main economic variables.

Moreover, it is observed that labour income risk (*LIRIII*) has the expected positive sign and it is also statistically significant in all household saving regressions (Table V.19). The econometric results are once again in favour of the precautionary saving hypothesis, which proposes that households postpone their consumption and raise their saving level to be protected against labour income risk. The additional rise in household saving can be interpreted as precautionary saving, which might be in the form of financial assets due to their liquidity.

Table IV.19 – The Pooled OLS Regression of Household Saving on LIRIII [(1)]

Pooled OLS Regression

	LASAVI	**LASAVII**	**LASAVI**	**LASAVII**	**LASAVI**	**LASAVII**
	Coefficient	*Coefficient*	*Coefficient*	*Coefficient*	*Coefficient*	*Coefficient*
Explanatory Variables	*Std. Err.*	*Std. Err.*	*Std. Err.*	*Std. Err.*	*Std. Err.*	*Std. Err.*
Household Permanent Income	0.123*	0.128*	0.058*	0.058*	0.058*	0.059*
	0.011	0.011	0.015	0.015	0.015	0.014
Real Estate	0.168*	0.187*	0.171*	0.189*	0.171*	0.189*
	0.013	0.012	0.013	0.012	0.013	0.013
Labour Income Risk (*LIRIII*)	0.470*	0.537*	0.483*	0.550*	0.470*	0.539*
	0.043	0.042	0.044	0.041	0.049	0.047
Children < 18	1.507***	1.680**	1.457***	1.626**	1.451***	1.591**
	0.850	0.765	0.819	0.779	0.818	0.799
Children > 18	1.420***	1.589**	1.426***	1.595**	1.420***	1.558***
	0.861	0.786	0.833	0.791	0.843	0.808
Nuclear Family	2.303*	2.502*	2.195*	2.388*	2.190**	2.360*
	0.867	0.799	0.844	0.808	0.851	0.820
Traditional Family	2.467**	2.777*	2.479*	2.791*	2.464**	2.747*
	0.996	0.917	0.940	0.899	0.989	0.926
Single Parent Family	1.671***	1.198	1.655***	1.179	1.686***	1.165
	0.922	0.862	0.918	0.854	0.910	0.904
No Health Insurance	-1.215*	-1.575*	-1.263*	-1.626*	-1.258*	-1.619*
	0.245	0.229	0.251	0.234	0.236	0.239
No Social Security	-1.067*	-1.118*	-1.081*	-1.133*	-1.079*	-1.133*
	0.220	0.199	0.226	0.201	0.210	0.215
Additional Employment	-	-	-0.306	-0.267	-0.753	-0.955**
			0.265	0.243	0.477	0.474
Multiple Income-Earner	-	-	1.300*	1.373*	1.274*	1.394*
			0.197	0.189	0.265	0.252
LIRI-AE	-	-	-	-	0.245	0.376***
					0.216	0.214
LIRI-MIE	-	-	-	-	0.015	-0.007
					0.092	0.089
Rural Region	-0.443*	-0.369**	-0.471*	-0.405**	-0.461*	-0.392**
	0.166	0.157	0.166	0.161	0.164	0.156
Dummy 2004	-0.240***	0.071	-0.236***	0.074	-0.236***	0.074
	0.137	0.131	0.134	0.131	0.141	0.133
Constant	-2.696*	-2.308*	-2.163*	-1.744**	-2.136**	-1.695**
	0.908	0.822	0.880	0.835	0.881	0.860
Number of obs.	13,703	13,703	13,703	13,703	13,703	13,703
R-squared	0.052	0.069	0.055	0.073	0.055	0.073
Adj. R-squared	0.051	0.068	0.054	0.072	0.054	0.072
Wald chi2	Wald chi2(12)		Wald chi2(14)		Wald chi2(16)	
	834.88	1,052.24	884.62	1,058.77	847.64	1,177.05
Prob. > chi2	0.000	0.000	0.000	0.000	0.000	0.000

(1) The standard errors are estimated using the bootstrap method with 1,000 replications in the pooled OLS regressions.

*, ** and *** represent statistical significance levels of 1%, 5% and 10%, respectively.

However, it is not possible to comment on the structure of household wealth in the empirical analysis, since the TURKSTAT Household Budget Surveys do not provide information about this issue apart from housing wealth. At the same time, it is established that there is a positive and statistically significant relationship between household saving decisions and labour income risk. Thus, it is reasonable to assert that the precautionary motive for saving is influential in household consumption and saving behaviour in Turkey.

According to the econometric results, when the elasticity for the third labour income risk (*LIRIII*) is calculated at the sample means, other things being equal, it is observed that a 10 % increase in the third labour income risk (*LIRIII*) leads to a rise between 9.2 % and 9.4 % in the first definition of household saving (*LASAVI*) and an increase between 8.2 % and 8.4 % in the second definition of household saving (*LASAVII*).[36] It is possible to interpret the rise in household saving as a result of an increase in labour income risk as precautionary saving. Moreover, these percentages indicate that households postpone their consumption and increase their saving level against labour income risk considerably, since a 10 % increase in the labour income risk is actually a modest rise. In addition to that, the elasticities of the first and the second labour income risk variables are calculated at the sample means, they point at even higher increases in household saving, other things being equal. For instance, a 10 % increase in the first labour income risk (*LIRI*) leads to a rise between 13.3 % and 13.7 % in the first definition of household saving (*LASAVI*) and an increase between 11.6 % and 11.9 % in the second definition of household saving (*LASAVII*).

[36] The elasticity of uncertainty is calculated by multiplying the estimated regression coefficient for labour income risk with the mean value of labour income risk for the sample and then, dividing the sum by the mean value of household saving for the sample.

Moreover, the estimated increases in household saving as a result of labour income risk, which can be considered as precautionary saving, is significant and thus, reveals the empirical importance of precautionary saving in total household saving in Turkey. The econometric results provide support in favour of the precautionary saving hypothesis and also are parallel to the empirical findings of Guariglia (2001), Lusardi (1997) and Guariglia and Kim (2003a).

The econometric results from the pooled Tobit regressions are similar to the econometric results from the pooled OLS regressions, which indicate the robustness of the empirical findings (Table IV.20). The main economic variables have the expected positive signs and have statistically significant regression coefficients in the estimated household saving regressions using the pooled Tobit models. However, the number of observations and the magnitudes of the regression coefficients are different compared to the pooled OLS regressions, since the dependent variables (*LSAVI* and *LSAVII*) have different values and distributional characteristics compared to the former logarithmic transformations of household saving (*LASAVI* and *LASAVII*).

It is observed that household permanent income and real estate ownership have positive and statistically significant regression coefficients in the first set of pooled Tobit regressions (Table IV.20). The dummy variables for children in the family and family characteristics also have positive and statistically significant regression coefficients. However, the dummy variables for the lack of social security and health insurance coverage have statistically significant, but negative regression coefficients in the estimated household saving regressions as before (Table IV.20).

Table IV.20 – The Pooled Tobit Regression of Household Saving on LIRI [(1)]

Pooled Tobit Regression (censored from left)

	LSAVI	**LSAVII**	**LSAVI**	**LSAVII**	**LSAVI**	**LSAVII**
	Coefficient	*Coefficient*	*Coefficient*	*Coefficient*	*Coefficient*	*Coefficient*
Explanatory Variables	*Std. Err.*	*Std. Err.*	*Std. Err.*	*Std. Err.*	*Std. Err.*	*Std. Err.*
Household Permanent Income	0.052*	0.055*	0.031*	0.034*	0.031*	0.035*
	0.002	0.002	0.003	0.003	0.003	0.003
Real Estate	0.046*	0.046*	0.047*	0.047*	0.047*	0.047*
	0.003	0.003	0.003	0.003	0.003	0.003
Labour Income Risk (*LIRI*)	0.169*	0.175*	0.176*	0.182*	0.166*	0.173*
	0.011	0.010	0.011	0.011	0.012	0.011
Children < 18	0.707*	0.746*	0.677*	0.729*	0.689*	0.745*
	0.177	0.170	0.165	0.169	0.174	0.169
Children > 18	0.764*	0.798*	0.757*	0.802*	0.772*	0.821*
	0.181	0.173	0.169	0.172	0.178	0.172
Nuclear Family	0.991*	1.032*	0.947*	1.001*	0.956*	1.014*
	0.183	0.175	0.172	0.175	0.180	0.173
Traditional Family	0.763*	0.704*	0.763/	0.714*	0.773*	0.729*
	0.203	0.200	0.200	0.201	0.202	0.199
Single Parent Family	0.346***	0.355***	0.320***	0.341***	0.372***	0.394**
	0.191	0.197	0.187	0.194	0.193	0.200
No Health Insurance	-0.598*	-0.690*	-0.624*	-0.715*	-0.626*	-0.716*
	0.061	0.058	0.064	0.060	0.061	0.059
No Social Security	-0.262*	-0.233*	-0.262*	-0.234*	-0.260*	-0.231*
	0.052	0.049	0.054	0.049	0.053	0.049
Additional Employment	-	-	0.136**	0.134**	-0.033	0.025
			0.061	0.054	0.115	0.109
Multiple Income-Earner	-	-	0.398*	0.382*	0.339*	0.319*
			0.041	0.037	0.063	0.060
LIRI-AE	-	-	-	-	0.081***	0.052
					0.047	0.047
LIRI-MIE	-	-	-	-	0.026	0.027
					0.021	0.021
Rural Region	-0.127*	-0.139*	-0.154*	-0.167*	-0.150*	-0.164*
	0.036	0.034	0.039	0.035	0.037	0.034
Dummy 2004	0.092*	0.082*	0.092*	0.081*	0.091*	0.081*
	0.030	0.028	0.030	0.028	0.030	0.028
Constant	5.492*	5.490*	5.660*	5.641*	5.670*	5.645*
	0.193	0.183	0.182	0.188	0.191	0.181
Number of obs.	8,376	9,100	8,376	9,100	8,376	9,100
Pseudo R-squared	0.058	0.063	0.061	0.066	0.061	0.066
Wald chi2d	Wald chi2(12)		Wald chi2(14)		Wald chi2(16)	
	1,716.55	2,007.16	1,856.05	2,118.90	1,839.31	2,142.22
Prob. > chi2	0.000	0.000	0.000	0.000	0.000	0.000

(1) The standard errors are estimated using the bootstrap method with 1,000 replications in the pooled Tobit regressions.

*, ** and *** represent statistical significance levels of 1%, 5% and 10%, respectively.

Moreover, the first approximation of labour income risk variable (*LIRI*) has the expected positive sign and it is statistically significant in all household saving regressions. The dummy variable for the presence of multiple income-earners in the family and the interaction term for that are positive and statistically significant in the pooled Tobit regressions. Thus, the pooled Tobit models also provide support in favour of the precautionary saving hypothesis (Table IV.20).

The econometric results from the second set of pooled Tobit regressions are also in accordance with the previous econometric results and thus, provide empirical support in favour of the precautionary saving hypothesis (Table IV.21). The main economic variables have the expected positive signs and have statistically significant regression coefficients in the estimated household saving regressions. However, the magnitudes of the regression coefficients are different from the previous econometric results. Especially, the magnitudes of the regression coefficients of the second labour income risk (*LIRII*) are significantly higher than the estimates for labour income risk in the first set of pooled Tobit regressions.

It is observed that household permanent income and real estate ownership have positive and statistically significant regression coefficients in the second set of pooled Tobit regressions. The dummy variables for children in the family and family characteristics are not statistically significant, but the dummy variables for the lack of social security and health insurance coverage are negative and statistically significant as before. Moreover, the second approximation of labour income risk variable (*LIRII*) has the expected positive sign and it is statistically significant in all household saving regressions (Table IV.21).

Table IV.21 – The Pooled Tobit Regression of Household Saving on LIRII [(1)]

Pooled Tobit Regression (censored from left)

	LSAVI	**LSAVII**	**LSAVI**	**LSAVII**	**LSAVI**	**LSAVII**
	Coefficient	*Coefficient*	*Coefficient*	*Coefficient*	*Coefficient*	*Coefficient*
Explanatory Variables	*Std. Err.*	*Std. Err.*	*Std. Err.*	*Std. Err.*	*Std. Err.*	*Std. Err.*
Household Permanent Income	0.054*	0.057*	0.034*	0.038*	0.035*	0.038*
	0.002	0.002	0.003	0.003	0.003	0.003
Real Estate	0.045*	0.045*	0.046*	0.046*	0.046*	0.046*
	0.003	0.003	0.003	0.003	0.003	0.003
Labour Income Risk (*LIRII*)	0.317*	0.330*	0.340*	0.352*	0.355*	0.368*
	0.038	0.036	0.037	0.037	0.039	0.038
Children < 18	-0.070	-0.035	-0.124	-0.076	-0.130	-0.080
	0.157	0.153	0.155	0.147	0.154	0.151
Children > 18	0.005	0.032	-0.025	0.014	-0.034	0.008
	0.161	0.154	0.157	0.149	0.158	0.152
Nuclear Family	0.283***	0.325**	0.222	0.277***	0.218	0.275***
	0.169	0.159	0.163	0.156	0.165	0.157
Traditional Family	0.042	-0.017	0.020	-0.029	0.014	-0.032
	0.189	0.184	0.196	0.181	0.188	0.182
Single Parent Family	0.331***	0.349***	0.308	0.337***	0.300***	0.331***
	0.184	0.180	0.188	0.181	0.182	0.179
No Health Insurance	-0.850*	-0.953*	-0.901*	-1.002*	-0.895*	-0.996*
	0.086	0.083	0.087	0.084	0.086	0.083
No Social Security	-0.359*	-0.333*	-0.360*	-0.334*	-0.365*	-0.338*
	0.052	0.049	0.054	0.050	0.052	0.050
Additional Employment	-	-	0.117**	0.116**	0.063	0.150
			0.060	0.055	0.116	0.118
Multiple Income-Earner	-	-	0.377*	0.359*	0.451*	0.417*
			0.041	0.041	0.064	0.060
LIRI-AE	-	-	-	-	0.054	-0.029
					0.089	0.100
LIRI-MIE	-	-	-	-	-0.076	-0.059
					0.048	0.045
Rural Region	-0.153*	-0.165*	-0.177*	-0.190*	-0.177*	-0.189*
	0.037	0.035	0.038	0.036	0.038	0.036
Dummy 2004	0.029	0.017	0.024	0.012	0.024	0.012
	0.032	0.031	0.032	0.031	0.031	0.031
Constant	6.386*	6.392*	6.563*	6.551*	6.551*	6.537*
	0.171	0.165	0.167	0.163	0.168	0.164
Number of obs.	8,376	9,100	8,376	9,100	8,376	9,100
Pseudo R-squared	0.050	0.054	0.053	0.057	0.053	0.057
Wald chi2	Wald chi2(12)		Wald chi2(14)		Wald chi2(16)	
	1,559.92	1,657.86	1,708.89	2,057.19	1,676.25	1,817.82
Prob. > chi2	0.000	0.000	0.000	0.000	0.000	0.000

(1) The standard errors are estimated using the bootstrap method with 1,000 replications in the pooled Tobit regressions.

*, ** and *** represent statistical significance levels of 1%, 5% and 10%, respectively.

The econometric results from the pooled Tobit regression of household saving (*LASAVI* and *LASAVII*) on the third approximation of labour income risk (*LIRIII*) are parallel to the first set of econometric results (Table V.22). The econometric results from the final set of household saving regressions are considered as more important than the previous econometric results, since the third approximation of labour income risk (*LIRIII*) is measured by the multinomial logit model. The econometric results are similar to the previous results from the pooled Tobit models in every aspect such as the magnitudes of the regression coefficients and the statistical significance levels of the main economic variables.

Moreover, it is observed that labour income risk (*LIRIII*) has the expected positive sign and it is statistically significant in the estimated household saving regressions. The pooled Tobit models also provide empirical support in favour of the precautionary saving hypothesis, which suggests that households postpone their consumption and raise their saving level to be protected against labour income risk. Thus, the econometric investigation process confirms that there is a positive and significant relationship between household saving decisions and labour income risk in Turkey (Table V.22).

However, it is necessary to mention that the estimated increases in household saving due to a rise in labour income risk is minimal and quantitatively unimportant according to the results of the pooled Tobit models. It is observed that a 10 % increase in the third labour income risk (*LIRIII*) leads to a rise between 0.7 % and 0.8 % in the first definition of household saving (*LASAVI*) and only a 0.8 % increase in the second definition of household saving (*LASAVII*).

Table IV.22 – The Pooled Tobit Regression of Household Saving on LIRIII [(1)]

Pooled Tobit Regression (censored from left)

	LSAVI	**LSAVII**	**LSAVI**	**LSAVII**	**LSAVI**	**LSAVII**
	Coefficient	*Coefficient*	*Coefficient*	*Coefficient*	*Coefficient*	*Coefficient*
Explanatory Variables	*Std. Err.*	*Std. Err.*	*Std. Err.*	*Std. Err.*	*Std. Err.*	*Std. Err.*
Household Permanent Income	0.052*	0.054*	0.032*	0.035*	0.032*	0.035*
	0.002	0.002	0.003	0.003	0.003	0.003
Real Estate	0.047*	0.047*	0.048*	0.048*	0.048*	0.048*
	0.003	0.003	0.003	0.003	0.003	0.003
Labour Income Risk (*LIRIII*)	0.122*	0.129*	0.127*	0.134*	0.113*	0.121*
	0.011	0.010	0.010	0.010	0.012	0.011
Children < 18	0.518*	0.563*	0.487*	0.544*	0.508*	0.564*
	0.171	0.176	0.173	0.164	0.168	0.176
Children > 18	0.583*	0.623*	0.574*	0.625*	0.599*	0.650*
	0.174	0.180	0.177	0.169	0.172	0.180
Nuclear Family	0.810*	0.860*	0.766*	0.828*	0.782*	0.843*
	0.176	0.182	0.179	0.170	0.173	0.181
Traditional Family	0.591*	0.539*	0.589*	0.546*	0.606*	0.563*
	0.202	0.206	0.205	0.197	0.200	0.207
Single Parent Family	0.329***	0.332***	0.304	0.318	0.387***	0.396***
	0.196	0.199	0.197	0.194	0.198	0.204
No Health Insurance	-0.465*	-0.553*	-0.486*	-0.572*	-0.485*	-0.571*
	0.060	0.060	0.061	0.058	0.060	0.060
No Social Security	-0.309*	-0.279*	-0.310*	-0.281*	-0.306*	-0.277*
	0.053	0.050	0.053	0.051	0.053	0.050
Additional Employment	-	-	0.121**	0.119**	-0.074	-0.039
			0.057	0.052	0.100	0.099
Multiple Income-Earner	-	-	0.384*	0.367*	0.307*	0.293*
			0.041	0.039	0.060	0.058
LIRI-AE	-	-	-	-	0.104**	0.083***
					0.044	0.043
LIRI-MIE	-	-	-	-	0.037***	0.036***
					0.021	0.020
Rural Region	-0.142*	-0.154*	-0.167*	-0.180*	-0.161*	-0.175*
	0.036	0.034	0.037	0.035	0.037	0.035
Dummy 2004	0.098*	0.088*	0.098*	0.088*	0.098*	0.088*
	0.031	0.029	0.030	0.029	0.031	0.028
Constant	5.805*	5.796*	5.972*	5.946*	5.977*	5.949*
	0.188	0.193	0.186	0.180	0.185	0.194
Number of obs.	8,376	9,100	8,376	9,100	8,376	9,100
Pseudo R-squared	0.053	0.058	0.056	0.061		
	Wald chi2(12)		Wald chi2(14)		Wald chi2(16)	
	1545.50	1,818.35	1,702.27	2,048.35		
Prob. > chi2	0.000	0.000	0.000	0.000	0.000	0.000

(1) The standard errors are estimated using the bootstrap method with 1,000 replications in the pooled Tobit regressions.

*, ** and *** represent statistical significance levels of 1%, 5% and 10%, respectively.

IV.3.D – Discussion

Previous empirical literature suggests that the size of precautionary saving is at best modest (Browning and Lusardi, 1996).[37] However, the empirical analysis reveals that precautionary saving has an important share in total household saving. The significant size of precautionary saving in Turkey might stem from three main factors:

I. The first reason is the serious structural problems of the Turkish economy. The macroeconomic uncertainties are accompanied by instability in the financial markets and an unsatisfactory social security system. Thus, these negative circumstances might have intensified the amount of precautionary saving.

II. The second important issue is the development of a proxy variable to capture future labour income uncertainty. The econometric results clearly indicate that to reveal the empirical importance of precautionary saving the source of income risk must be identified clearly and the risk variable must be defined accordingly.

III. The definition of the dependent variable in the empirical analysis is crucial, since household saving rates are negative for a significant part of society.

Moreover, it might be a good idea for future empirical analysis to examine the situation of private sector employees separately from the public sector employees, since the employment conditions in the public sector are quite different from the private sector. Civil servants and workers in the public sector enjoy greater job-

[37] See Chapter II for a comprehensive literature survey on this issue.

security and health insurance coverage, whereas only salary earners in the private sector have a higher income level and health insurance coverage, but they also face a significant probability of losing their jobs.

Unfortunately, the TURKSTAT Household Budget Surveys do not provide information about the employment history of currently unemployed individuals and also individuals, who lost their jobs recently. Therefore, it is not possible to estimate the probability of becoming unemployed separately for private sector employees and public sector employees. It is expected that the probability of being unemployed and the probability of job-loss are higher for private sector employees and in particular, for wage-earners.

IV.4 – Conclusion

The fundamental proposition of the precautionary saving hypothesis is that households postpone their consumption expenditures and raise their saving level to safeguard themselves against future labour income uncertainty. The empirical analysis indicates that labour income risk is one of the key determinants of household saving in Turkey. Moreover, it is observed that precautionary saving has a significant share in total household saving in Turkey. Households are forced to be more prudent about their saving decisions. In this respect, the empirical analysis in this chapter supports the precautionary saving hypothesis.

On the other hand, it is observed that majority of households are unable to realise positive savings and the TURKSTAT Household Budget Surveys do not provide information about the financial wealth holdings of households, which restricts

the scope of the empirical analysis. Even though, the precautionary motive for saving has a significant role in household saving decisions, households raise their saving level only to a certain extent to safeguard against labour income risk. Therefore, it is probable that these factors lead to the underestimation of the share precautionary saving in total household saving.

Moreover, it is observed that households implement alternative strategies to secure their future income prospects, but households are still vulnerable against future labour income uncertainty. It is thought that households consider income smoothing as an alternative approach to consumption smoothing, when it is not feasible to raise their saving level. Household members hold additional employment and there are also multiple income-earners, especially in the extended families, to increase their income as well as the sources of their income.

The empirical analysis reveals that the alternative strategies implemented by households diminish the influence of future labour income uncertainty on household consumption and saving behaviour, but labour income risk remains as a significant variable in household saving decisions. Thus, it is thought that only the advancement of the social security system can make a significant contribution to this issue. The improvement of the unemployment insurance scheme will definitely remove the pressure to a certain extent, especially for the working-class individuals.

This empirical analysis in this chapter is restricted to the impact of labour income risk on household saving decisions. However, there are different types and definitions of income risk in the economy, which might influence different groups of society separately. For instance, labour income risk is derived from the probability of becoming unemployed and as a result of that, it can be very important for working-class individuals, but its influence on household consumption and saving behaviour of

entrepreneurs might be limited. On the other hand, the volatility of entrepreneurial income might have a stronger impact on entrepreneurs' household saving decisions. In addition to that, paying insufficient attention to different types and definitions of income risk might lead to the underestimation of the share of precautionary saving in total household saving. Thus, the next chapter analyses the role of the entrepreneurs in the formation of precautionary saving.

Chapter V

The Role of Entrepreneurs in the Accumulation of Precautionary Saving

V.1 – Introduction

The aim of this empirical chapter is to explore the role of the entrepreneurial class in the formation of precautionary saving in Turkey. The entrepreneurial class is generally considered as prosperous businessmen and women, who accumulate wealth to invest in their private firms. Therefore, the saving decisions of entrepreneurs are usually analysed within a different category, *i.e.* as private firms' investment decisions.

However, the presence of a wealthy businessman or woman in the family will have a significant influence on household consumption and saving behaviour. Household characteristics will be dramatically different, if the household head is an entrepreneur instead of a salary or wage earner. Moreover, the entrepreneurial class is composed of both employers and the self-employed individuals. For this reason, the entrepreneurial class might show significant heterogeneity within itself, too.

Although, entrepreneurs constitute the richest segment of society in all countries, entrepreneurial income is more volatile compared to any other source of

individual disposable income. The volatility of entrepreneurial income causes their future income stream to be uncertain, which might lead to the emergence of a precautionary motive for saving for entrepreneurs. The source of the uncertainty lies in the difficulty in predicting entrepreneurial income, which is also affected by business cycles and seasonality. Thus, entrepreneurs might be compelled to accumulate greater amounts of financial wealth to safeguard against unanticipated negative income shocks and to smooth their consumption patterns.

Entrepreneurs do not benefit from the social security system as much as civil servants. In particular, the self-employed individuals are vulnerable to the volatility of income and out-of-pocket health expenditures. Hence, entrepreneurs are expected to accumulate greater amounts of wealth to ensure their well-being, especially for their retirement period. Moreover, the presence of entrepreneurs in the economy and their share of total wealth are even more important within the context of developing countries. In particular, the ratio of the self-employed individuals to the total population is far greater in developing countries compared to developed countries (Le, 1999).

Entrepreneurs are generally considered as the driving force behind the growth of the economy. Private investment plays an important role in the growth of the economy both in the short and long run. On the one hand, it stimulates economic growth in the current period and on the other hand, it raises the growth potential of the economy. The most important aspect of private investment is its contribution in research and development, which raises the level of human capital and also the level of international competitiveness of the country. In addition to this, in many countries entrepreneurs' share of total household wealth is exceptionally large compared to any other group of society.

The analysis of the economic decisions of entrepreneurs is a newly emerging and an interesting topic, especially for the developing countries. It is asserted that the promotion of entrepreneurship, especially among women, is one of the feasible ways to improve both society and the economy in the developing world.[38] However, the role of the entrepreneurial class in the accumulation of household saving and in the formation of precautionary saving has not been investigated in the empirical literature previously.

It is thought that the precautionary saving hypothesis has not been discussed from the point of view of entrepreneurs for various reasons:

i. The lack of comprehensive microeconomic data about household finances, including the amount of financial assets owned by households in the economy and the decomposition of household saving into occupational groups such as working class individuals and entrepreneurs, limits the scope of empirical research. As a result of that, empirical research is restricted to more general categories of household saving and the heterogeneity within society cannot be exploited completely.

ii. The influence of having an entrepreneur in the family on household saving decisions might be very important. At the same time, it might be very difficult to measure the changes that it creates for household consumption and saving behaviour. For instance, it is observed that entrepreneurs prefer to invest in their own businesses than in any other type of household saving. However, it is not possible to estimate the capital gains from investment in business with a

[38] Muhammad Yunus was awarded the Nobel Peace Prize in 2006 for his contribution in the development of micro-credit policy to promote entrepreneurship especially among poor women in rural Bangladesh with the *Grameen Bank*, which was established for this aim.

conventional household budget survey, especially if there is a high inflation environment in the country. Therefore, it is thought that household saving is underestimated for entrepreneurs, which makes it difficult to investigate their consumption and saving behaviour.

On the other hand, the most interesting aspect of entrepreneurial behaviour is clearly their positive attitude towards risky investment projects (Knight, 1921). This feature renders the analysis of their behaviour particularly interesting. It is generally assumed that entrepreneurs are less risk-averse compared to the rest of the individuals in society due to their sizeable wealth accumulation and the nature of their businesses (Cramer *et al.*, 2002). At the same time, they are expected to seize profitable business opportunities. Therefore, their saving decisions might show significant differences compared to the other individuals in society (Gentry and Hubbard, 2000). For instance, it is observed that entrepreneurs are more likely to invest in their own businesses, which is also supported by the TURKSTAT Household Budget Surveys.

In the light of this discussion, it is possible to list the potential motives for saving for entrepreneurs as follows:

I. To capitalise on profitable business opportunities,

II. To protect themselves against unanticipated negative income shocks,

III. To finance their health expenditures,

IV. To finance their consumption expenditures during the retirement period and

V. To leave a bequest for their relatives, *i.e.* a successful business enterprise.

The presented list is not exclusive or exhaustive, but it is useful in the sense that it underlines the fact that the motives for saving for entrepreneurs are more diverse than generally presumed for other individuals in the economy. At the same

time, this discussion contributes to the explanation of the main reasons behind the high saving level of the entrepreneurs. Moreover, the second motive underlines the importance of entrepreneurial income risk, which results in the emergence of the precautionary saving motive, while the rest of the motives are consistent with the Life-Cycle Theory of Saving.

The contribution of this empirical chapter is to analyse the behaviour of entrepreneurs under risk and uncertainty. It is thought that empirical research on the role of entrepreneurs will contribute to the understanding of household consumption and saving behaviour. In particular, the focus of the empirical analysis is the impact of entrepreneurial income risk on household saving decisions. The empirical analysis is restricted to families, whose household head is an entrepreneur in the business sectors of the economy, which excludes the agricultural sector. The empirical analysis will be a significant contribution to the existing literature, since entrepreneurial income risk has not been defined as a separate income risk category previously.

The outline of this empirical chapter is as follows: Section V.2 discusses the role of entrepreneurs in the accumulation of household saving and in particular, in the formation of precautionary saving. Section V.3 performs a descriptive analysis of the TURKSTAT Household Budget Surveys, which analyses the role of entrepreneurs in their families and their household characteristics. Moreover, the approximation of business income risk and the econometric results for the impact of business income risk on the household saving decisions of entrepreneurs are presented in this section. Finally, Section V.4 concludes this chapter with a critique of the empirical analysis and directions for future empirical research on this issue.

V.2 – Theoretical Background

The purpose of this section is to discuss household saving decisions from the point of view of entrepreneurs. Previous empirical literature indicates that the precautionary motive for saving is significant for all individuals in society, but the share of precautionary saving in total household saving is especially important for two main groups: older households and business-owners. It is necessary to focus on these two household groups with more emphasis in order to reveal the empirical importance of precautionary saving. Although, entrepreneurial income is accepted as an important source of income risk, a proxy variable for entrepreneurial income risk has not been proposed in the past. Thus, the analysis of entrepreneurial income risk will contribute to further understanding of the precautionary saving hypothesis.

V.2.A – Household Consumption and Saving Behaviour of Entrepreneurs

The concepts of risk and uncertainty are often cited together in the literature, which leads to the confusion that they are the same thing. However, these two concepts are actually different from each other. One of the main developments in the field of individual decision-making theory is to differentiate risk and uncertainty from each other (Knight, 1921). The concept of risk is understood as a situation, when there are different possible outcomes with different probabilities, but it is feasible to estimate the probability of each outcome. However, uncertainty is defined as a situation, when the probability of an outcome is unknown. Therefore, it is reasonable to argue that a risky situation becomes a normal good provided that the probability

distributions of related outcomes are calculated ex-ante and the risks associated with these outcomes can be transferred to the capital markets.[39]

Nevertheless, this is a more complicated issue for entrepreneurs and especially for the self-employed individuals. There is a vast empirical literature on the choice of entrepreneurship, which is enriched by both economics and sociology fields. Previous empirical literature for entrepreneurship searched for plausible explanations on two main topics:

1) The reasons behind the choice of self-employment and
2) The choice of self-employment in spite of the earnings differential between self-employment and wage/salary income.

Both reduced form equations and structural models, which are implemented in order to shed light on these topics, reached similar results (Le, 1999). The individual's choice of self-employment depends on various social, economic and demographic reasons. It is observed that the individual's age, education level, family background, work experience and liquidity constraints that the individual might possibly face are significant factors in the probability of choosing self-employment (Evans and Jovanovic, 1989). For instance, if the individual's father is already self-employed and owns a profitable business, then this situation creates a positive example for the individual, which increases his/her probability of choosing self-employment significantly (Hamilton, 2000).

[39] For instance, a farmer might prefer to insure his/her expected agricultural production at a reasonable insurance premium. In other words, the farmer can insure his/her agricultural income against potential risks in the agricultural production. In this manner, he/she will guarantee at a certain amount of income whether it is a good harvest or not. Thus, a risky situation such as agricultural production can be considered as a normal good, which can be bought and sold in the financial markets.

Several empirical papers focused on the role of the immigrant communities in the choice of self-employment of individuals. It is observed that the possibility of self-employment is higher, if the individual belongs to a sizeable immigrant community. These empirical findings point to the importance of cluster effects within the ethnic communities. At the same time, it is observed that the duration of the stay in the new country and the proficiency level of the language of the new country increase the probability of the choice of self-employment (Evans and Leighton, 1989).

The choice of self-employment in spite of the earnings differential between self-employment and wage/salary income still remains as a puzzle (Moskowitz and Vissing-Jørgensen, 2002). It is observed that the income level of the self-employed individuals is actually lower than average salary and wage levels in many countries. Hamilton (2000) argues that non-pecuniary benefits such as *being your own boss* might be important for individuals in the choice of self-employment. Hence, this discussion underlines the importance of individual characteristics in the choice of self-employment as a profession.

At this point, it is necessary to mention that there is also a significant income gap between salary and wage earners. Moreover, it might be difficult for some individuals to find employment as a salary earner, if their education level is not high and their social environment is limited in that sense. As a result, many individuals might consider the choice of self-employment as the only type of employment and income opportunity available for themselves. This is especially the case for members of the immigrant communities, whether they are from a different country or only from a different region of the same country might have limited importance. For instance, the TURKSTAT Household Budget Surveys indicate that the income level of the self-employed individuals is higher than that of wage earners, but their income level is

lower than salary earners. Therefore, it is a better idea to compare the income level of the self-employed individuals with wage earners rather than salary earners to gain information about their participation in the labour market.

V.2.B – The Role of Entrepreneurs in the Accumulation of Household Saving

The precautionary saving hypothesis is considered as one of the most plausible reasons for the empirical failure of the Modern Consumer Theory.[40] However, the empirical importance of precautionary saving has been evaluated as small and limited in the previous literature. A reasonable explanation for this contradiction might be the lack of empirical research on the saving decisions of entrepreneurs in the economy.

Kennickell and Lusardi (2004) analysed the 1995 and 1998 cross-sections of the Survey of Consumer Finances (SCF) prepared for the U.S. economy. The SCF 1995 survey and later 1998 survey are broadened with the inclusion of a new question to reveal the size of the desired level of precautionary savings of households. The exact wording of this question is as follows: "*About how much do you think you and your family need to have in savings for unanticipated emergencies and other unexpected things that may come up?*" The introduction of this new question aims to overcome the technical difficulties that limited the previous empirical research. First of all, the question is not restricted to a single type of income risk and it overcomes the difficulties in the approximation of income risk. The contribution of this particular question is twofold: 1) to gain information about households' saving preferences and

[40] See Chapter III for more information on this topic.

2) their desired level of precautionary savings rather than their actual precautionary savings.

The empirical analysis shows that the precautionary motive for saving exists and is influential in the saving decisions of all households in the economy. It is understood that households are concerned about the presence of different types of risks in their daily lives such as labour income risk and health risk. Therefore, it is necessary to take the precautionary motive for saving into account in the analysis of household saving decisions. However, the actual amount of precautionary saving is observed as significant only for elderly people and business-owners in the sample.

The findings of Kennickell and Lusardi (2004) are consistent with the findings of previous theoretical and empirical literature. Gourinchas and Parker (2002) predict that the precautionary motive for saving becomes dominant over the life-cycle motive for saving after the individuals pass middle age. The only objection that can be raised against this proposition is the fact that according to the Life/Cycle Theory of Saving households are able to accumulate significant amounts of wealth only after a certain age level. The unequal distribution of wealth over age during the individual's life-time makes it more difficult to reveal the true impact of the precautionary motive for saving on household saving decisions.

Hurst *et al.* (2005) developed the empirical analysis of Kennickell and Lusardi (2004) further by dividing their sample from the PSID from the 1980s and 1990s for the U.S. economy into two separate groups for business-owners and for the rest of the sample. Their empirical analysis takes into account the fact that business-owners are more prosperous, but face a more volatile income stream than the rest of the individuals in society. It is observed that the share of precautionary saving in total household saving is estimated at a substantially smaller level when the sample is

analysed after being divided into two sub-groups. The presence of business-owners in the sample raises the share of precautionary saving in total household saving. Therefore, it is argued that the exclusion of business-owners in the data set leads to the under-estimation of the amount of precautionary saving.

The empirical analysis of Hurst *et al.* (2005) concentrates on labour income risk rather than entrepreneurial income risk. However, the source of concern should be business income risk for entrepreneurs, since their disposable income is derived from their entrepreneurial activities. Moreover, business-owners do not only face the possibility of losing their jobs and becoming unemployed if the business fails, but they also suffer from a high degree of volatility in their income stream. Therefore, it is important to analyse the impact of business income risk on household saving decisions for families, whose household head is a business-owner. In this framework, a proxy variable for business income risk must be developed and utilised in the econometric investigation process in order to obtain more reliable results about the share of precautionary saving in total household saving.

It is thought that the perception of risk of entrepreneurs might show significant differences compared to the other individuals in society. It is generally assumed that entrepreneurs are less risk-averse compared to the remaining households, but at the same time they are faced with a higher number of risk categories with more serious consequences. Entrepreneurs suffer from business income risk, which is based on the high volatility of their entrepreneurial income and thus, the difficulty in the prediction of entrepreneurial income for various reasons. However, they are not protected from labour income risk, which is dependant on the possibility of becoming unemployed and also from health expenditures risk, which is the possibility of out-of-pocket health expenditures.

On the contrary, their social security and health insurance coverage rates are limited compared to the salary-earners. They can become unemployed as a result of a business failure, which leads to the loss of all their investment in their businesses as well as their human capital in their specialised field, which is developed through work experience and social environment over time. Therefore, it is reasonable to expect to observe a higher income level for business-owners, but their saving decisions might be more complicated than initially assumed. In this respect, it might be harder to understand their saving decisions.

In this context, the entrepreneurial class has a broader definition due to the inclusion of employers and the self-employed individuals. However, it is important to distinguish between employers and the self-employed individuals in the analysis of entrepreneurs, since employers own large companies with higher levels of cash flow and profit compared to the small and medium-sized enterprises (SMSE) of the self-employed individuals. Thus, there are significant economic and social differences among employers and the self-employed individuals.

Another important issue is the difference between the agricultural sector and the business sectors, which are composed of industry, construction and service sectors of the economy. Moreover, *business-owners* are employers and the self-employed individuals from the business sectors of the economy. In this context, *business income ris*k is defined as the entrepreneurial income risk of employers and the self-employed individuals from the business sectors, which excludes agricultural income completely.

The TURKSTAT Household Budget Surveys provide information about the main economic activity of the individuals based on the income level, but there is also information about having additional employment. The main economic activity of an individual is defined as the one, which brings the highest amount of earnings to the

individual. It is possible that a self-employed individual can hold a second job to smooth his/her income and consumption level. It is thought that this approach is very common for in the rural regions, where farmers look for an employment opportunity, which is related to agricultural, to benefit from their knowledge and work experience (Tansel, 1992).[41]

Households may implement an income-smoothing approach as an alternative method to precautionary saving in order to smooth consumption during difficult time periods. It is possible that especially the self-employed individuals shift their labour to the other sectors of the economy from their own businesses to create additional income sources to support their families. For instance, a local shop-owner might choose to present his/her goods for sale in another part of the town as well, if he/she considers business in his/her original store slow.[42] However, the situation can be more complicated for an employer, since their income level is higher than the self-employed individuals and they generally have a better social status than the self-employed individuals, which might restrict their behaviour. In addition to that, it is expected that they do not suffer from liquidity constraints as much as the self-employed individuals.

V.2.C – The Precautionary Saving Hypothesis under Business Income Risk

The role of entrepreneurs in the formation of precautionary saving has been proposed as a research topic only recently. Previously, the precautionary motive for

[41] See Chapter IV for more discussion on additional employment.
[42] A good example of this idea can be participating in the Sunday markets for realising additional sales, which is a custom that is still kept in many countries.

saving was simply reduced to future labour income uncertainty and thus, it was generalised to the entire population. However, three important points are raised in the empirical and theoretical literature with respect to risk and uncertainty in time.

1. It is necessary to distinguish between different types of risk and uncertainty in the economy. There can be different income risk categories apart from labour income risk, since there are different sources of individual disposable income.
2. It is important to acknowledge the fact that households might be influenced at different levels from the same types of risk and uncertainty due to their own social and demographic characteristics.
3. It is observed that the sensitivity of households to different types of risk and uncertainty depend on the level of wealth and household wealth reaches its peak level after the middle age of an individual.

All of these factors help to explain the high share of business-owners and old households in total household saving. Moreover, it is commonly observed that these demographic groups accumulate the majority of precautionary saving in the economy (Kennickell and Lusardi, 2004).

The precautionary saving hypothesis is consistent with the premises of the theory of inter-temporal allocation of consumption. The precautionary motive for saving for households emerges, if the source of risk is clearly identified, but the risk cannot be transferred to the capital markets. Thus, households will be conscious of the risks associated with their future income stream. In this respect, the precautionary saving hypothesis proposes that the presence of income risk will force households to postpone their consumption expenditures and raise their saving level in order to be prepared against a negative outcome such as an unforeseen drop in their income level.

At the same time, the expected rise in the amount of saving will lead to the postponement of the consumption expenditures. Under these circumstances, the most sensible option is to accumulate financial assets because of their liquidity. However, there are different forms of household saving, as there are different types of risks in the economy. Especially, for entrepreneurs an alternative option might be to invest in their own businesses.

The precautionary saving hypothesis can be presented in a formal manner to incorporate the business income risk as in the next equation (5.1). The approximation of the business income risk will be introduced into the household saving equation along with household permanent income, housing wealth and social and demographic variables.

$$S_h = \alpha_h + \delta \hat{Y}_h^P + \chi W_h + \sum_{k=1}^{K} \beta_k X_{hk} + \gamma \tilde{B}_h + \upsilon_h \tag{5.1}$$

In the above equation, the dependant variable is household saving (S_h); (Y_h^P) is household permanent income, (W_h) is housing wealth, (X_h) is a matrix of dummy variables, which represents social and demographic characteristics of the family, and finally, ($\tilde{B}_h$) is the business income risk of the household head. In addition to the social and demographic variables, a time-dummy variable for 2004 is also included in the household saving equation.

The formal representation of household saving according to the precautionary saving hypothesis is actually derived from the theoretical discussion in the previous

chapter.[43] In fact, the equation (5.1) is an amended version of the equation (4.5) from the previous chapter for business income risk rather than labour income risk. However, this household saving regression is estimated only for business-owners, which might lead to a sample-selection bias in the household saving equation. For this reason, the preferred econometric estimation technique must be suitable to overcome the latent sample-selection bias.

The most challenging aspect of the discussion of the precautionary saving hypothesis is the conceptualisation of the business income risk. The main idea behind the approximation of business income risk is the high volatility of entrepreneurial income. The volatility of entrepreneurial income is the main source of concern, since it does not only create risks for the private firm, but it also restricts the life-styles of entrepreneurs indirectly by being an artificial financial constraint on their household consumption expenditures (Hurst and Lusardi, 2004).[44]

V.3 – Empirical Research

The empirical analysis will investigate the precautionary saving accumulation of entrepreneurs in Turkey. It is assumed that entrepreneurs have a major role in the accumulation of precautionary saving, since their future income is exposed to risk and their wealth level is greater than the rest of the individuals in society. However, it is necessary to mention that the sensitivity of entrepreneurs to risk and uncertainty might show significant differences compared to the other individuals in society.

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[43] See the Theoretical Background section of Chapter IV for more information on this discussion.
[44] See Chapter III for more information on the effects of the presence of uninsurable income risk and liquidity constraints in the economy.

The empirical analysis will discuss the economic and social characteristics of all entrepreneurs from all sectors of the economy, including the agricultural sector. However, the econometric investigation process will concentrate on entrepreneurs from the business sectors only. In other words, entrepreneurs from the agricultural sector will not be included in the estimated saving regressions, since the formation of agricultural income is completely different from the rest of the sectors. Moreover, the source of uncertainty in agricultural income such as unpredictable weather conditions is not related to the sources of uncertainty that affect entrepreneurial income in the business sectors.

V.3.A – A Descriptive Analysis of Household Budget Surveys

The purpose of this sub-section is to provide a brief descriptive analysis of the TURKSTAT Household Budget Surveys. The crucial aspects of the descriptive analysis will be entrepreneurial income, social and demographic characteristics of households and household saving. The identification of the source of business income risk is the essence of the empirical analysis in order to reveal the empirical importance of precautionary saving. The approximation of the business income risk variable will be introduced in the following sub-section.

Entrepreneurs constitute only a small fraction of society, i.e. around 8 % of the total population, when the agricultural and the business sectors are brought together (Table V.1). It is observed that the ratio of the entrepreneurs in the agricultural sector decreased in 2004 compared to the previous years, whereas it increased slightly in the business sectors. The distribution of entrepreneurs to the business sectors, which are

composed of construction, industry and services, are presented in the Table.V.4. It is possible to define entrepreneurs from the business sectors as *business-owners,* who make up 4.3 % of the total individuals in the sample.

It is understood that the transformation of the agricultural income support schemes and the significant internal migration rate from the rural regions to the urban regions of the country had a visible influence on entrepreneurs from the agricultural sector. At the same time, the Turkish economy had an uninterrupted period of growth after the financial crisis in 2001, when the growth of the economy mainly stemmed from the industry and the service sectors with the construction sector making the highest contributions. Therefore, it is expected that entrepreneurs concentrated in the business sectors rather than the agricultural sector during this time period. Despite the falling importance of the agricultural sector in the economy, almost half of employers and self-employed individuals are still working in the agricultural sector in Turkey (Table V.1).

Table V.1 – The Distribution of Entrepreneurs to the Sectors of the Economy

	Agriculture		**Business Sectors**		**Total**	
	Number	*Ratio (%)*	*Number*	*Ratio (%)*	*Number*	*Ratio (%)*
2003	4,554	4.23	4,605	4.28	9,159	8.51
2004	1,370	3.87	1,548	4.37	2,918	8.24
Total	5,924	4.14	6,153	4.30	12,077	8.44

Source: TURKSTAT Household Budget Surveys (Individuals)

Households' saving preferences are revealed with an interesting question in the TURKSTAT Household Budget Survey 2003. Households are asked to provide information about their saving preferences. It would be interesting to analyse this particular survey question for families, whose household head is an entrepreneur. It is observed that the incidence of a preference for investment in business is significantly

higher for these families compared to the rest of society. It is observed that investment in business is a common type of household saving for many Turkish families. On the other hand, the accumulation of financial assets might serve multiple purposes such as to seize an emerging profitable business opportunity and to be prepared against an unforeseen negative income shock at the same time.

It is observed that the number of self-employed individuals is significantly greater than the number of employers across sectors (Table V.2). This is especially the case for the agricultural sector, which indicates that the majority of the farmers work on their own land to support their families. Moreover, the number of employers in the agricultural sector is very small compared to the business sectors. This indicates that large-scale land ownership is quite rare and farm businesses are not developed enough to create jobs for more individuals in Turkey.

Table V.2 – The Distribution of Entrepreneurs to the Occupational Groups (%)

	Agriculture		**Business Sectors**		**Total**	
	Self-Employed	*Employer*	*Self-Employed*	*Employer*	*Self-Employed*	*Employer*
2003	48.4	1.3	32.6	17.6	81.0	19.0
2004	44.3	2.6	36.8	16.2	81.2	18.8
Total	47.4	1.6	33.7	17.3	81.1	18.9

Source: TURKSTAT Household Budget Surveys (Individuals)

At the same time, the influence of entrepreneurs on the performance of the economy is further intensified with their position in the family. It is observed that entrepreneurs are predominantly male and considered as the head of their families (Table V.3). In addition to that, once again it is observed that the role of women both in the family life and in the economic life is limited in Turkey.

Table V.3 – Social and Demographic Properties of the Entrepreneurs (%)

	Agriculture				Business Sectors			
	Male	*Female*	*Head*	*Member*	*Male*	*Female*	*Head*	*Member*
2003	41.7	8.0	42.1	7.6	47.2	3.1	42.2	8.1
2004	39.1	7.8	38.1	8.9	49.9	3.2	44.7	8.4
Total	41.1	7.9	41.1	7.9	47.8	3.1	42.8	8.2

Source: TURKSTAT Household Budget Surveys (Individuals)

The largest numbers of entrepreneurs are observed in the service sectors, as expected, due to the inherent flexible character of these sectors. This is followed by the industry and the construction sectors. The share of the construction sector in the economy is very small around 5 % of the Gross Domestic Product (GDP). However, it is one of the most dynamic sectors of the economy. It makes a positive and significant contribution to the growth of the economy, since the value added of the construction sector increases much faster than all the sectors of the economy. One of the main reasons for the dynamism of the construction sector is the large-scale involvement of the private sector. It is possible to interpret that from the relatively high number of entrepreneurs in the construction sector (Table V.4).

Table V.4 – The Distribution of Entrepreneurs to the Business Sectors

	Business Sectors				All Entrepreneurs
	Industry	*Construction*	*Service*	*Total*	
2003	763	223	3,619	4,605	9,159
2004	262	63	1,223	1,548	2,918
Total	1,025	286	4,842	6,153	12,077

Source: TURKSTAT Household Budget Surveys (Individuals)

Housing wealth can be used as a reliable measure to analyse the wealth level of families in society (Table V.5). Household wealth is available only for families just like consumption and saving figures rather than individuals in the TURKSTAT Household Budget Surveys. Thus, the analysis of housing wealth is realised based on the occupation of the household head. It is clearly seen that families, whose household

head is an entrepreneur, have a significantly greater wealth level compared to the rest of the families in the country.

Table V.5 – The Distribution of Housing Wealth to the Occupational Groups
(*Mean Values, Million TL., 2003 prices*)

	Entrepreneurs				**All Families**
	Agriculture		**Business Sectors**		
	Self-Employed	*Employer*	*Self-Employed*	*Employer*	*Households*
2003	43,563.7	121,344.7	31,423.7	72,589.6	33,592.2
2004	43,913.2	96,419.4	34,050.0	74,827.4	34,813.7
Total	43,639.8	111,964.2	32,124.2	73,095.0	33,896.4

Source: TURKSTAT Household Budget Surveys (Households)

Moreover, it is observed that, as expected, employers are more prosperous than self-employed individuals. Employers from the agricultural sector have a greater housing wealth level than employers from the business sectors, since the definition of housing wealth covers all types of land ownership including farms. However, the TURKSTAT Household Budget Surveys provide information only about this type of household wealth in the economy. For instance, the amount of households' financial wealth accumulation is not available in the surveys.

Finally, it is observed that entrepreneurial income is significantly higher than average disposable income in the economy (Table V.6). It is seen that the business environment generates a higher level of income stream for entrepreneurs. Farmers have a lower level of income compared to business-owners, but they still earn more than the rest of the individuals in society provided that they are considered as entrepreneurs. It is thought that agricultural workers without land ownership such as seasonal workers suffer the most in society.

Table V.6 – Main Economic Variables
(*Mean Values, YTL., 2003 prices*)

	Entrepreneurial Income				Individual Disposable Income	
	Agriculture		Business Sectors			
	Monthly	*Annual*	*Monthly*	*Annual*	*Monthly*	*Annual*
2003	406.0	4,872.3	868.7	9,952.8	183.6	2,068.9
2004	400.0	4,799.6	990.9	11,615.4	205.8	2,346.6
Total	404.6	4,855.5	899.5	10,371.1	189.1	2,137.6

Source: TURKSTAT Household Budget Surveys (Individuals)

Moreover, it is observed that if the household head is an entrepreneur, then household saving preferences show significant differences compared to the rest of the families for various reasons. First of all, it is thought that their higher income and wealth level influence their household saving decisions. This proposition is supported by the observation that a higher proportion of entrepreneurs expressed that they are able to perform positive amount of savings compared to the rest of the households. In addition to that, they prefer to invest in their businesses at a higher percentage than any other saving option. This percentage increases further and becomes 14.9 %, when entrepreneurs from the agricultural sector are left aside and only business-owners are included in the empirical analysis (Table V.7). At the same time, the percentage of financial assets is lower than business investment in household saving preferences, which is another important difference between business-owners and the rest of the households. The existing literature concentrates on the problems in the measurement of entrepreneurial income, but it is seen that the measurement of household saving of entrepreneurs is also challenging (Hamilton, 2000).

Table V.7 – Household Saving Preferences of Business-Owners

Saving Options	2003		
	Frequency	*Percent. (%)*	*Cum. (%)*
1) Housing investment	123	3.2	3.2
2) Partnership in a housing co-op.	39	1.0	4.2
3) Gold	146	3.8	8.0
4) Foreign currency	195	5.1	13.0
5) Bank deposit	100	2.6	15.6
6) Stock exchange	6	0.2	15.8
7) Treasury bills and bonds	10	0.3	16.0
8) Hedge funds	10	0.3	16.3
9) Business investment	574	14.9	31.2
10) Lending money with interest	1	0.0	31.2
11) Other	35	0.9	32.1
12) No savings	2,623	67.9	100.0
Positive savings *	1,239	32.1	-
Financial Assets **	467	12.1	-
Total	3,862	100.0	100.0

Source: TURKSTAT Household Budget Survey 2003
* Positive savings are composed of saving options between the 1st and 11th categories.
** Financial assets are composed of saving options between the 3rd and 8th categories.

V.3.B – Econometric Investigation Process

In this context, a *business-owner* is defined as an entrepreneur, who is actually an employer or a self-employed individual from the business sectors of the economy. Moreover, *business income* is the entrepreneurial income of business-owners. In this respect, the econometric analysis depends on the identification and approximation of *business income risk* and its impact on household saving decisions for entrepreneurs. However, the empirical analysis is restricted to the business-owners, but it excludes the entrepreneurs from the agricultural sector due to the particular characteristics of this sector in the Turkish economy.

The determinants of agricultural income and also the sources of uncertainty associated with agricultural income are entirely different from those of the business sectors. Agricultural income can be affected by many external developments such as unpredictable weather conditions and international crop prices movements. However,

the business sectors are influenced by changes in the demand conditions more than anything else. Thus, agricultural income risk is considered as a separate research topic and it is not analysed in this empirical chapter.

However, a preliminary econometric analysis is conducted to shed light on this discussion, which confirms the initial arguments that the determinants of agricultural income are different from those of business income. For instance, the education level of the individual does not affect the agricultural income of the family, whereas it is one of the most important determinants of entrepreneurial income of employers and the self-employed individuals from the business sectors. Moreover, the development of a proxy variable for agricultural income risk, which is consistent with the definition provided by Browning and Lusardi (1996) is not possible using only the TURKSTAT Household Budget Surveys and it is beyond the scope of this empirical chapter.[45]

V.3.B.a – The Approximation of Business Income Risk

The most important aspect of the empirical analysis is the approximation of business income risk in line with the principles classified by Browning and Lusardi (1996) for a suitable proxy variable.[46] Both the volatility of income and the volatility of consumption are used as proxy variables for risk and uncertainty either in a saving equation or in a growth of consumption equation in the previous empirical literature.[47]

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[45] See Paxson (1992) for a suitable proxy variable for agricultural income.

[46] According to Browning and Lusardi (1996), a potential uncertainty measure must be an observable variable and also exogenous to the individual's decisions and behaviour. Finally, a potential uncertainty measure must be variable across the population to account for the heterogeneity in society.

[47] The volatility of income and the volatility of consumption have been used extensively to estimate the share of precautionary saving in total household saving in the previous empirical literature. See Chapter

However, in this context the volatility of entrepreneurial income is more appropriate for the approximation of the business income risk variable, since it is the difficulty in the prediction of entrepreneurial income, which forces business-owners to postpone their household consumption expenditures and raise their household saving level. Hence, a successful approximation of business income risk can be derived based on the variance of entrepreneurial income.[48]

However, the approximation of business income risk is obstructed by many technical difficulties:

- One of the main difficulties is the complexity of the estimation of the expected values of entrepreneurial income for business-owners.
- Moreover, the level of entrepreneurial income is significantly higher than any other source of disposable income. Thus, its variance reaches extensively high levels compared to the other variables, which requires a normalisation process.
- Entrepreneurial income is affected by business cycles, seasonality and national holidays. For this reason, it is required to separate the volatility, which might be created by such effects from the business income risk variable.

Business income risk is approximated as a ratio, which indicates the dispersion of entrepreneurial income from its expected value. The ratio of the standard deviation of entrepreneurial income to the predicted values of entrepreneurial income is defined as business income risk, which is shown in the equation (5.3). The predicted values of entrepreneurial income are considered as the expected values of entrepreneurial

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III for more information on the literature about various proxy variables in the precautionary saving hypothesis.

[48] The variance of a variable is defined as the square of the deviation of each observation from the expected value (mean). It indicates the degree of the volatility of a variable, which can be considered as a measure of uncertainty. The variance of a random variable X is calculated as follows:
$Var(X) = \mathrm{E}\left[(X - \mu)^2\right]$.

income and thus, the mean level of entrepreneurial income for every business-owner. The variance of entrepreneurial income is calculated as the square of the difference between the actual and the predicted values of entrepreneurial income.

$$BIR_i = \left[\frac{Std.Dev.(entrepreneurialincome)_i}{Mean(entrepreneurialincome)_i} \right] \tag{5.3}$$

It is possible to develop an uncertainty measure, which is dependant on the volatility of entrepreneurial income, variable across the business-owners and finally, exogenous to the business-owners' decisions and behaviour with this approach. Thus, the proposed business income risk variable is consistent with the principles outlined by Browning and Lusardi (1996) for a suitable uncertainty measure.

The idea behind the approximation of the business income risk variable is to reveal that business-owners have different degrees of income risk among themselves. Entrepreneurial income is more volatile compared to the other sources of disposable income, but the volatility of income is not sufficient to create a precautionary motive for saving on its own. There has to be an element of uncertainty in the future income prospects to force business-owners to postpone their consumption expenditures and raise their saving level to be prepared against business income risk such as unforeseen negative income shocks. For instance, business-owners should be able to predict their entrepreneurial income to a certain extent, even if it is highly volatile compared to the other sources of disposable income. For this reason, the business income risk variable cannot be based solely on the volatility of income. Therefore, it is necessary to show that the volatility of income with respect to its mean level is significantly higher for

some business-owners compared to the rest of them, which indicates that it is more difficult for these business-owners to predict their future income stream. It is expected that the saving level of business-owners, who are more exposed to income risk, will be higher compared to business-owners, who have a lower level of business income risk. In this respect, it is thought that there will be a positive and direct relationship between household saving and business income risk.

Both monthly and annual entrepreneurial income figures are available in the TURKSTAT Household Budget Surveys and the business income risk variable is estimated using both annual and monthly entrepreneurial income figures. However, annual entrepreneurial income figures are considered as more reliable compared to monthly entrepreneurial income figures due to the presence of business cycles and seasonality effects in the economy. The first approximation of the business income risk variable (*BIRI*) is based on annual entrepreneurial income figures (*A*) as shown in the following equation (5.4):

$$BIRI_i = \left\{ \frac{\left(\hat{A}_i - A_i\right)^{1/2}}{A_i} \right\} \qquad (5.4).$$

Â: prediction of annual entrepreneurial income

A: annual entrepreneurial income

The second business income risk variable (*BIRII*) is estimated using monthly entrepreneurial income figures (*M*), as shown in equation (5.5). It is assumed that monthly entrepreneurial income figures remain consistent in a single year and thus, monthly entrepreneurial income figures are simply multiplied by twelve to reach an

annual approximate value for entrepreneurial income (*MA*). However, it is observed that these figures are actually quite close to the annual entrepreneurial income figures (*A*).

$$BIRII_t = \left\{ \frac{\left(\hat{MA}_i - MA_i \right)^{1/2}}{MA_i} \right\} \tag{5.5}$$

M: monthly entrepreneurial income

MA: annualised monthly entrepreneurial income

$\hat{MA}$ *: prediction of annualised monthly entrepreneurial income*

The prediction of entrepreneurial income is essentially similar to the estimation of the permanent component of current disposable income. The theoretical formulation of the entrepreneurial income equation is presented at below (5.6).

$$\mathrm{E}_i = \mu + \sum_{k=1}^{K} \varphi_k X_i + \nu_t \tag{5.6}$$

Entrepreneurial income of business-owners (E_i) is regressed on social and demographic variables such as age, age-squared and the dummy variables for gender, education level, occupational group and employment status, which are represented by the (X_i) matrix. Moreover, a time-dummy variable for 2004 is introduced into the

entrepreneurial income equation to capture the time-specific effects. The fitted values from the estimated entrepreneurial income regressions are obtained and used as the prediction of entrepreneurial income in the approximation of business income risk variables.

The TURKSTAT Household Budget Surveys 2003 and 2004 are analysed together in order to increase the precision in the estimation of entrepreneurial income for individuals from the business sectors. The pooled cross-sectional data set contains 6,152 observations for employers and self-employed individuals, who constitute the business-owners in the economy. Entrepreneurial income figures are estimated with 2003 prices in new Turkish Lira (YTL) figures.

The econometric results of the two Heckman two-step selection models for annual entrepreneurial income (*A*) and also for annualised monthly entrepreneurial income (*MA*) are presented in Table V.8. The selection criterion is being a business-owner in the first step of both Heckman two-step selection models. Thus, the models provide information about the determinants of the choice of entrepreneurship at the same time. However, the sample set for this regression is restricted to the business-owners in the first stage, which might lead to a sample-selection bias in the empirical analysis. The positive aspect of the implementation of the Heckman two-step selection model is the introduction of an *Inverse Mill Ratio* into the second stage OLS regression to overcome the potential sample-selection bias.

Moreover, it is necessary to have at least one variable in the first stage probit model, which is not included in the second stage OLS regression in the Heckman two-step selection model. The exclusion variable, which is included in the first stage probit model, but excluded from the second stage OLS regression, is essentially an instrument. The selection criterion is being a business-owner in the first stage of the

Heckman two-step selection models. The business sectors are composed of industry, services and construction sectors and are more common in the urban regions of the country, since the agricultural sector is already left aside. Moreover, it is observed that business-owners are mostly from the urban regions of the country and thus, living in an urban region is one of the prerequisites of being a business-owner in Turkey. The dummy variable for *living in an urban region* is considered as a valid instrument for this reason. Therefore, the dummy variable for living in an urban region is introduced into the first stage the probit model, but it is not included in the second stage OLS regression. It is observed that the regression coefficient of this dummy variable in the probit model is positive and statistically significant as expected (Table V.8).

The econometric results from the first Heckman two-step selection model are shown in the second and third columns of the Table V.8. The dependent variable in the first stage probit model is a dummy variable, which takes the value of one if the individual is a business-owner and zero otherwise. It is observed that the probability of being a business-owner increases with age, but it decreases as the individual becomes older. It is possible that individuals become more risk-averse as they get older and as a result of that, the choice of self-employment is more common for younger individuals. The level of education is positively associated with the probability of being a business-owner, but it is also observed that the probability of being a business-owner is actually lower for university graduates. It is thought that well-educated individuals prefer to search for employment in large private firms and public institutions for various reasons. Income level, job-security and social security coverage might be important factors that influence their labour market participation decisions. However, they might also believe that their education, knowledge and talents are utilised better in a more sophisticated business environment. On the other

hand, the probability of being a business-owner is positive and statistically significant for managers and professionals such as accountants, doctors and lawyers. The choice of self-employment might be promising for young professionals, since if they can prove themselves successful in private practise, their income level will be higher in the long run.

The dependent variable in the second stage is the logarithmic values of annual entrepreneurial income of business-owners (Table V.8). The econometric results from the second stage OLS regression are in the expected direction. It is observed that entrepreneurial income increases with age and age-squared, which indicates that experience is an important factor in the formation of entrepreneurial income. Moreover, it is seen that a higher education level positively influences entrepreneurial income of business-owners, but women earn significantly less than men and the self-employed individuals have a lower income level compared to employers as expected. Finally, the time-dummy variable for 2004 is also positive and statistically significant, which indicates that business-owners benefited from the strong growth performance of the economy. The fitted values from the second stage OLS regression are saved and used as the prediction of entrepreneurial income in the approximation of the first business income risk variable (*BIRI*).

The econometric results from the second Heckman two-step selection model are shown in the fourth and fifth columns of the Table V.8. The dependent variable in the first stage probit model is a dummy variable, which takes the value of one if the individual is a business-owner and zero otherwise. The dependent variable in the first stage probit model is the same with the first Heckman two-step selection model, but the numbers of uncensored observations are slightly lower in the second Heckman two-step selection model, since monthly entrepreneurial income is available for 6,137

individuals. It is observed that the reasons behind the choice of self-employment and the factors that influence the formation of entrepreneurial income are the same. The regression coefficients of the probit model from the second Heckman model are very similar to the values of the first Heckman model and have close statistical significance levels to the first Heckman model, as expected.

Table V.8 – The Estimation of Business Income for Entrepreneurs [(1)]

Heckman selection model – two-step estimates – (regression model with sample selection)

First Stage – Probit Model

Explanatory Variables	**Business-Owner**		**Business-Owner**	
	Coef.	**Std. Err.**	**Coef.**	**Std. Err.**
Age	0.070*	0.013	0.069*	0.012
Age-squared	-0.001*	0.000	-0.001*	0.000
Female	-0.418*	0.082	-0.418*	0.083
Household Head	0.181**	0.081	0.179**	0.085
Student	-0.312**	0.129	-0.325*	0.127
Married	0.065	0.077	0.068	0.074
Extended Family	0.102	0.082	0.102	0.084
Literate	0.412***	0.236	0.413***	0.232
Primary School	0.498**	0.213	0.497**	0.213
Secondary School	0.411***	0.215	0.411***	0.212
High School	0.108	0.212	0.106	0.211
University Degree	-0.323	0.215	-0.324	0.214
Postgraduate	-0.101	0.262	-0.102	0.257
Manager	3.785*	0.136	3.781*	0.131
Professional	2.109*	0.141	2.106*	0.139
Sales Personal	0.912*	0.144	0.910*	0.139
Farmer	-4.853*	0.623	-4.848*	0.584
Skilled Worker	1.420*	0.129	1.417*	0.124
Self-Employed	5.192*	0.601	5.191*	0.559
Industry	-0.101	0.062	-0.098***	0.059
Service	0.124***	0.063	0.127**	0.061
No Social Security Coverage	0.111	0.056	0.109**	0.054
No Health Insurance Coverage	-0.053	0.054	-0.056	0.054
Urban	0.102**	0.043	0.105**	0.044
Dummy 2004	-0.080**	0.036	-0.079**	0.036
Constant	-5.222*	0.323	-5.219*	0.325

Table V.8 – The Estimation of Business Income for Entrepreneurs (cont'd)

Second Stage – OLS Regression

Explanatory Variables	Log of Annual Entrepreneurial Income		Log of Annualised Monthly Entrepreneurial Income	
	Coef.	**Std. Err.**	**Coef.**	**Std. Err.**
Age	0.041*	0.009	0.042*	0.008
Age-squared	0.000*	0.000	0.000*	0.000
Female	-0.619*	0.078	-0.578*	0.074
Household Head	0.408*	0.067	0.301*	0.059
Student	-0.043	0.108	0.017	0.114
Married	0.040	0.057	0.014	0.053
Extended Family	0.278*	0.074	0.198*	0.063
Literate	-0.116	0.118	-0.006	0.121
Primary School	0.145	0.097	0.185***	0.108
Secondary School	0.243**	0.102	0.288*	0.109
High School	0.355*	0.100	0.416*	0.111
University Degree	0.692*	0.111	0.697*	0.118
Postgraduate	1.305*	0.190	1.381*	0.181
Manager	0.608*	0.046	0.568*	0.038
Professional	0.681*	0.064	0.634*	0.054
Sales Personal	0.319*	0.057	0.260*	0.051
Farmer	0.624**	0.290	0.588**	0.231
Skilled Worker	0.361*	0.044	0.323*	0.040
Self-Employed	-0.394*	0.040	-0.386*	0.035
Industry	-0.193*	0.039	-0.204*	0.036
Service	-0.082**	0.034	-0.069**	0.031
No Social Security Coverage	-0.476*	0.039	-0.392*	0.033
No Health Insurance Coverage	0.156*	0.039	0.133*	0.035
Additional Employment	-0.168*	0.041	-0.134*	0.037
Dummy 2004	0.123*	0.027	0.104*	0.026
Constant	7.248*	0.207	7.430*	0.192
Inverse Mills Ratio	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**
lambda	0.062**	0.026	0.052**	0.024
rho	0.078		0.071	
sigma	0.806		0.731	
lambda	0.062	0.028	0.052	0.026
Number of obs.		94,034		94,019
Censored obs.		88,040		88,040
Uncensored obs.		5,994		5,979
Wald chi2(25)		2,548.16		2,648.72
Prob. > chi2		0.000		0.000

(1) The standard errors are estimated using the bootstrap method with 1,000 replications in the Heckman two-step selection model.

* and ** represent statistical significance levels of 1% and 5%, respectively.

The dependent variable in the second stage OLS regression is the logarithmic values of annualised monthly entrepreneurial income of business-owners and the

econometric results from this regression are consistent with the previous results (Table V.8). The regression coefficients from the second Heckman two-step selection model have similar magnitudes and statistical significance levels with the regression coefficients from the first Heckman two-step selection model. The fitted values from the second stage OLS regression are obtained and used as the prediction of entrepreneurial income in the approximation of the second business income risk variable (*BIRII*). Finally, *lambda* is statistically significant in both second-stage OLS regressions, which confirms the choice of the Heckman two-step selection model to overcome the sample-selection bias in the empirical analysis.

Business income risk is dependent only on entrepreneurial income of business-owners. Therefore, the rest of individual disposable income, which is derived from other sources, are put aside in the approximation of the business income risk variable. Moreover, the business income risk variable is estimated only for business-owners, which restricts the sample set to a smaller number of observations. As a result of that, the explanatory variables in the entrepreneurial income equation are different than the explanatory variables in the estimation of individual permanent income equation. In particular, the empirical analysis provides more information about the determinants of business income. However, the permanent income equation is more general compared to the entrepreneurial income equation. Moreover, it is quite interesting to be able to compare the determinants of these income variables with each other. This comparison creates the chance to comment on the labour market decisions of employers and the self-employed individuals with respect to their potential income level. It is thought that this aspect of the empirical analysis is an important contribution of this chapter to the literature on the returns to self-employment.

The measurement of entrepreneurial income with household budget surveys is generally a very difficult task, especially in the developing countries (Deaton, 1997). Households might underestimate their entrepreneurial income because of various reasons such as the complexity of income taxes in the service sector or consumption from production in the agricultural sector. More importantly, they might deliberately hide some of their entrepreneurial income in order to benefit from the social security such as free public health care services.

However, it is observed that annual and monthly entrepreneurial income figures are consistent with each other in the TURKSTAT Household Budget Surveys. The descriptive statistics of annual entrepreneurial income (*A*) and annualised monthly entrepreneurial income (*MA*) of business-owners are very close to each other. Moreover, the econometric results indicate that annual entrepreneurial income and annualised monthly entrepreneurial income are determined by the same social and economic factors. Thus, the statistical properties of the predicted values of annual entrepreneurial income ($\hat{A}$) and annualised monthly entrepreneurial income ($\hat{MA}$) are also similar to each other (Table V.9). Hence, it is thought that the survey participants gave reliable answers to the questions presented to them during the preparation of the TURKSTAT Household Budget Surveys in the light of this information.

Table V.9 – Descriptive Statistics of the Business Income Risk Variables

	Number of Obs.	*Mean*	*Std. Dev.*	*Min.*	*Max.*
A	6,152	8.762	1.032	0.000	12.844
MA	6,137	8.851	0.937	0.000	13.696
$\hat{A}$	6,152	8.742	0.620	6.488	10.737
$\hat{MA}$	6,152	8.833	0.568	6.800	10.764
BIRI	6,152	0.068	0.066	0.000	1.004
BIRII	6,137	0.062	0.057	0.000	1.002

It is observed that the range of the business income risk variables is between zero and one, since the proxy variables are measured as a ratio of the dispersion of entrepreneurial income from its expected mean level for each business-owner (Table V.9). The mean and the standard deviation of the first business income risk variable (*BIRI*) are slightly above those of the second business income risk variable (*BIRII*). However, the mean and the standard deviation values of the business income risk variables are close to each other. Thus, it is expected that their regression coefficients will also assume similar values in the household saving regressions.

The approximation of business income risk is realised is using all available individual observations (Table V.8). However, only the household heads' business income risk is introduced into the estimated household saving regressions in the empirical analysis. It is observed that more than 80 % of entrepreneurs are already considered as household heads in their families (Table V.3). This percentage is even higher for business-owners from the urban regions of the country. Therefore, it is thought that household heads' business income risk is a suitable proxy variable to capture the impact of business income risk on household saving decisions.

V.3.B.b – Econometric Results

The empirical analysis in this chapter focuses on the role of business-owners in the formation of household saving and in particular, their role in the accumulation of precautionary saving. Thus, the empirical analysis is restricted to employers and the self-employed individuals from business sectors of the economy. Therefore, the household saving equations are estimated only for families, whose household head is

a business-owner. As a result, the household saving regressions in this chapter have a smaller sample size compared to the other empirical chapters. Moreover, the main economic variables such as household permanent income and the monetary values of real estate ownership are introduced into the household saving equations after their logarithms are taken.

All the main economic variables such as business income risk and household permanent income are estimated using auxiliary regressions in the previous stages of the empirical analysis. The advantage of this approach is that it is a two-stage least squares regression process (*2SLS*) that aims to overcome the identification issue in the simultaneous-equations models. This approach helps to eliminate correlation between the error terms and the explanatory variables, which might emerge in the estimated household saving equations. Thus, the regression coefficients from the pooled OLS regressions, the pooled Tobit models and also the Heckman two-step selection models are unbiased and reliable. However, the standards errors of the estimated household saving equations must be corrected in the econometric analysis due to the inclusion of business income risk and permanent income, which are generated variables. For this reason, the standard errors of all of the estimated regressions are calculated using the nonparametric bootstrap method with 1,000 replications in this empirical chapter.

It is claimed that the presence of business income risk will force entrepreneurs and their families to postpone their consumption expenditures and raise their saving in the current period. However, the initial econometric results do not provide support for this formulation of the precautionary saving hypothesis. The econometric results from the pooled OLS regressions of household saving show that the regression coefficients of the business income risk variables (*BIRI* and *BIRII*) are statistically insignificant and also negative (Table V.10).

Table V.10 – The Pooled OLS Regressions for BIRI and BIRII [(1)]

Pooled OLS Regression				
Explanatory Variables	**BIRI**		**BIRII**	
	LASAVI	**LASAVII**	**LASAVI**	**LASAVII**
	Coefficient	*Coefficient*	*Coefficient*	*Coefficient*
	Std. Err.	*Std. Err.*	*Std. Err.*	*Std. Err.*
Household Permanent Income	0.031**	0.043*	0.029***	0.042*
	0.015	0.014	0.015	0.014
Real Estate	0.160*	0.193*	0.159*	0.191*
	0.023	0.022	0.022	0.022
Business Income Risk	-1.180	-2.662	3.086***	1.724
	1.811	1.717	1.849	1.756
Children < 18	1.902	2.714	2.017	2.800
	3.054	3.282	3.059	3.070
Children > 18	2.012	2.623	2.125	2.692
	3.057	3.278	3.053	3.070
Nuclear Family	2.928	3.721	3.013	3.779
	3.051	3.295	3.065	3.074
Traditional Family	2.980	4.117	3.114	4.222
	3.093	3.325	3.141	3.129
Single Parent Family	1.348	1.850	1.337	1.814
	3.184	3.430	3.210	3.238
No Health Insurance Coverage	-0.983*	-1.141*	-0.955*	-1.128*
	0.314	0.276	0.312	0.286
No Social Security Coverage	-0.972*	-0.962*	-1.017*	-1.012*
	0.264	0.243	0.269	0.237
Rural Region	0.155	-0.046	0.147	-0.052
	0.232	0.215	0.235	0.215
Dummy 2004	0.579*	0.560*	0.578*	0.563*
	0.207	0.192	0.208	0.199
Constant	1.263	1.000	0.960	0.712
	3.060	3.278	3.068	3.077
Number of obs.	5,024	5,024	5,017	5,017
R-squared	0.039	0.058	0.040	0.058
Adj. R-squared	0.037	0.056	0.038	0.056
Wald chi2	Wald chi2(12)			
	212.16	295.57	211.06	296.36
Prob. > chi2	0.000	0.000	0.000	0.000

(1) The standard errors are estimated using the bootstrap method with 1,000 replications in the pooled OLS regressions.
*, ** and *** represent statistical significance levels at 1%, 5% and 10%, respectively.

It is observed that household permanent income and housing wealth have positive and statistically significant regression coefficients in all household saving equations. Moreover, the dummy variables for the lack of health insurance and social

security coverage are statistically significant, but their regression coefficients are negative. The rest of the dummy variables for family characteristics and children in the family are not statistically significant. Finally, the dummy variable for the rural region is not statistically significant, but the dummy variable for 2004 is positive and statistically significant as expected (Table V.10).

The econometric results from the pooled Tobit regressions are similar to the results from the pooled OLS regressions except for the impact of the business income risk variables on household saving decisions of business-owners (Table V.11). The pooled Tobit regressions are censored from left, since the dependent variables are the logarithmic values of household saving (*LSAVI* and *LSAVII*), which do not include the negative values of household saving. It is observed that the regression coefficients of household permanent income and housing wealth are positive and also statistically significant in both household saving equations as in the former regressions. Moreover, the dummy variables for the lack of health insurance and social security coverage are statistically significant, but their regression coefficients are negative. It is thought that the influence of family characteristics and children in the family on household saving decisions of business-owners is limited compared to the economic variables, since the regression coefficients for the dummy variables are statistically insignificant once again. However, the regression coefficients of the business income risk variables (*BIRI* and *BIRII*) have the expected positive sign and they are statistically significant in both household saving equations, when the Tobit model is implemented for the logarithmic values of household saving (*LSAVI* and *LSAVII*). The econometric results from the pooled Tobit regressions are in favour of the precautionary saving hypothesis (Table V.11).

Table V.11 – The Pooled Tobit Regressions for BIRI and BIRII [(1)]

Pooled Tobit Regression (censored from left)				
Explanatory Variables	**BIRI**		**BIRII**	
	LSAVI	**LSAVII**	**LSAVI**	**LSAVII**
	Coefficient	*Coefficient*	*Coefficient*	*Coefficient*
	Std. Err.	*Std. Err.*	*Std. Err.*	*Std. Err.*
Household Permanent Income	0.029*	0.027*	0.029*	0.027*
	0.003	0.003	0.003	0.003
Real Estate	0.047*	0.047*	0.048*	0.048*
	0.005	0.005	0.005	0.005
Business Income Risk	6.482*	6.289*	5.612*	5.578*
	0.599	0.585	0.572	0.563
Children < 18	-0.495	-0.459	-0.362	-0.323
	0.310	0.327	0.317	0.328
Children > 18	-0.581	-0.517	-0.455	-0.391
	0.311	0.326	0.320	0.331
Nuclear Family	-0.279	-0.254	-0.149	-0.125
	0.321	0.339	0.326	0.336
Traditional Family	-0.405	-0.369	-0.315	-0.280
	0.328	0.349	0.343	0.348
Single Parent Family	-0.908**	-0.962**	-0.768***	-0.814**
	0.407	0.418	0.399	0.414
No Health Insurance Coverage	-0.389*	-0.438*	-0.407*	-0.452*
	0.071	0.069	0.071	0.070
No Social Security Coverage	-0.353*	-0.313*	-0.308*	-0.272*
	0.060	0.059	0.061	0.059
Rural Region	-0.105**	-0.138*	-0.096***	-0.125**
	0.050	0.051	0.051	0.050
Dummy 2004	0.071	0.102**	0.069	0.101**
	0.049	0.044	0.048	0.045
Constant	7.667*	7.708*	7.583*	7.610*
	0.319	0.337	0.324	0.336
Number of obs.	3,820	4,029	3,815	4,023
Pseudo R-squared	0.056	0.056	0.048	0.050
Wald chi2(12)	601.56	654.57	573.04	639.11
Prob. > chi-square	0.000	0.000	0.000	0.000

(1) The standard errors are estimated using the bootstrap method with 1,000 replications in the pooled Tobit models.

*, ** and *** represent statistical significance levels at 1%, 5% and 10%, respectively.

The sample set is restricted to families, whose household head is a business-owner, in the econometric investigation process to analyse their role in household saving decisions and in particular, in the formation of precautionary saving. However, this restriction might lead to sample-selection bias, which requires the introduction of

an Inverse Mills Ratio into the equations to overcome this potential problem. Thus, the Heckman two-step selection model is used in the regression of household saving on the business income risk variables along with social and economic variables. The selection criterion in the first stage probit models of the Heckman two-step selection models is that the household head is a business-owner. The dummy variable equals one if the household head is a business-owner and zero otherwise. The dependent variables in the second stage OLS regressions of the Heckman two-step selection models are the logarithmic transformations of household saving (*LSAVI* and *LSAVII*), which includes only positive values due to the transformation process Moreover, the Heckman two-step selection models are estimated at the household level, since the dependent variable is household saving. For this reason, the explanatory variables in the first and the second stages of the models are completely different from each other (Table V.12 and Table V.13).

The econometric results from the regression of the first business income risk variable (*BIRI*) on household saving using the Heckman two-step selection model are presented in Table V.12. The first stage probit model analysis the probability of being a business-owner for household heads, since the model is estimated at the household level. It is observed that the probability of being a business-owner increases with age, but at a decreasing rate for household heads. Moreover, the probability of being a business-owner is lower for women and students as expected. However, the results of the first stage probit model do not show a relationship between the level of education of the household head and the probability of being a business-owner in both of the household saving equations (Table V.12).

The estimation results of the second stage OLS regressions of the Heckman two-step selection model are parallel to the econometric results from the pooled Tobit

models. It is observed that the regression coefficients of household permanent income and real estate are positive and statistically significant. Moreover, the regressions coefficients of the dummy variables for the lack of health insurance and social security coverage are negative and statistically significant. At the same time, the regressions coefficients of the first business income risk variable (*BIRI*) have the expected positive sign and they are statistically significant in both household saving equations. Finally, the Inverse Mills Ratio (*lambda*) is statistically significant in both regressions, which confirms the choice of the Heckman two-step selection model to overcome the sample-selection bias issue in the empirical analysis.

Table V.12 – The Impact of Business Income Risk I on Household Saving [(1)]

Heckman selection model – two-step estimates – (regression model with sample selection)

First Stage – Probit Model

	BIRI			
	LSAVI		**LSAVII**	
Business-Owner	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**
Age	0.030***	0.016	0.035**	0.016
Age-squared	0.000***	0.000	0.000**	0.000
Female	-0.483**	0.213	-0.551**	0.22
Student	-0.570*	0.212	-0.568*	0.205
Married	-0.141	0.135	-0.165	0.126
Literate	0.723	0.632	0.720	0.786
Primary School	0.911	0.630	0.922	0.773
Secondary School	0.820	0.622	0.824	0.767
High School	0.481	0.626	0.473	0.770
University Degree	0.034	0.628	0.038	0.769
Postgraduate	0.259	0.653	0.289	0.793
Manager	3.719*	0.229	3.742*	0.228
Professional	2.111*	0.237	2.164*	0.231
Sales Personal	0.799*	0.236	0.800*	0.231
Farmer	-5.073*	1.254	-5.090*	1.612
Skilled Worker	1.382*	0.220	1.395*	0.220
Self-Employed	5.153*	1.248	5.165*	1.595
No Social Security	0.115	0.071	0.130***	0.067
No Health Insurance	-0.024	0.07	-0.043	0.068
Industry	-0.080	0.067	-0.072	0.067
Service	0.074	0.069	0.090	0.068
Dummy 2004	-0.042	0.042	-0.058	0.043
Constant	-4.435*	0.736	-4.516*	0.885

Table V.12 – The Impact of Business Income Risk I on Household Saving (cont'd)

Second Stage – OLS Regression

	BIRI			
	LSAVI		LSAVII	
Explanatory Variables	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**
Household Permanent Income	0.030*	0.003	0.028*	0.003
Real Estate	0.045*	0.005	0.045*	0.005
Business Income Risk I	6.487*	0.619	6.313*	0.607
Children < 18	-0.364**	0.184	-0.328***	0.179
Children > 18	-0.425**	0.183	-0.357***	0.183
Nuclear Family	-0.156	0.198	-0.128	0.195
Traditional Family	-0.249	0.218	-0.228	0.209
Single Parent Family	-0.767**	0.305	-0.817*	0.317
No Health Insurance	-0.378*	0.068	-0.425*	0.066
No Social Security	-0.285*	0.063	-0.243*	0.058
Rural Region	-0.057	0.049	-0.089***	0.051
Dummy 2004	0.088***	0.046	0.121*	0.043
Constant	7.350*	0.195	7.386*	0.193
Inverse Mills Ratio	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**
lambda	0.350*	0.030	0.364*	0.029
rho	0.277		0.290	
sigma	1.263		1.255	
lambda	0.350	0.030	0.364	0.030
Number of obs.		29,190		29,399
Censored obs.		25,371		25,371
Uncensored obs.		3,819		4,028
Wald chi2(12)		597.93		640.58
Prob. > chi2		0.000		0.000

(1) The standard errors are estimated using the bootstrap method with 1,000 replications in the Heckman two-step selection models.

*, ** and *** represent statistical significance levels at 1%, 5% and 10%, respectively.

The econometric results from the regression of the second business income risk variable (*BIRII*) on household saving with the Heckman two-step selection model are presented in Table V.13. It is observed from the first stage probit models that the probability of being a business-owner increases with age, but at a decreasing rate for household heads. Moreover, the probability of being a business-owner is lower for women and students as before. On the other hand, the probability of being a business-owner is higher for managers, professionals, sales personal, farmers, skilled workers

and the self-employed household heads as expected. However, the first stage probit models do not indicate a relationship between the level of education of the household head and the probability of being a business-owner in both of the household saving equations (Table V.13). The econometric results of the first stage probit models are consistent with the previous empirical analysis about the choice of self-employment in this empirical chapter.

Table V.13 – The Impact of Business Income Risk II on Household Saving [(1)]

Heckman selection model – two-step estimates – (regression model with sample selection)

First Stage – Probit Model

	BIRII			
	LSAVI		**LSAVII**	
Business-Owner	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**
Age	0.030***	0.016	0.035**	0.016
Age-squared	0.000***	0.000	0.000**	0.000
Female	-0.484**	0.214	-0.540**	0.218
Student	-0.570*	0.213	-0.605*	0.214
Married	-0.141	0.134	-0.153	0.131
Literate	0.723	0.625	0.720	0.737
Primary School	0.908	0.605	0.919	0.731
Secondary School	0.819	0.603	0.822	0.726
High School	0.479	0.604	0.471	0.726
University Degree	0.031	0.605	0.035	0.733
Postgraduate	0.256	0.635	0.286	0.748
Manager	3.716*	0.249	3.739*	0.240
Professional	2.108*	0.251	2.161*	0.245
Sales Personal	0.796*	0.250	0.798*	0.245
Farmer	-5.070*	1.625	-5.088*	1.454
Skilled Worker	1.378*	0.239	1.392*	0.236
Self-Employed	5.152*	1.637	5.166*	1.443
No Social Security	0.115***	0.070	0.129***	0.069
No Health Insurance	-0.027	0.072	-0.047	0.072
Industry	-0.075	0.068	-0.068	0.065
Service	0.078	0.068	0.093	0.068
Dummy 2004	-0.041	0.041	-0.057	0.042
Constant	-4.436*	0.743	-4.529*	0.825

Table V.13 – The Impact of Business Income Risk II on Household Saving (cont'd)

Second Stage – OLS Regression

	BIRII			
	LSAVI		**LSAVII**	
Explanatory Variables	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**
Household Permanent Income	0.030*	0.003	0.028*	0.003
Real Estate	0.046*	0.005	0.046*	0.005
Business Income Risk II	5.624*	0.581	5.594*	0.557
Children < 18	-0.230	0.193	-0.189	0.176
Children > 18	-0.297	0.193	-0.228	0.177
Nuclear Family	-0.025	0.208	0.005	0.190
Traditional Family	-0.158	0.224	-0.136	0.210
Single Parent Family	-0.625***	0.323	-0.666**	0.325
No Health Insurance	-0.395*	0.069	-0.438*	0.066
No Social Security	-0.240*	0.060	-0.203*	0.058
Rural Region	-0.046	0.052	-0.075	0.052
Dummy 2004	0.086***	0.047	0.120*	0.044
Constant	7.263*	0.212	7.285*	0.190
Inverse Mills Ratio	**Coef.**	**Std. Err.**	**Coef.**	**Std. Err.**
lambda	0.351*	0.030	0.363*	0.029
rho	0.274		0.286	
sigma	1.281		1.270	
lambda	0.351	0.031	0.363	0.030
Number of obs.		29,185		29,393
Censored obs.		25,371		25,371
Uncensored obs.		3,814		4,022
Wald chi2(12)		544.44		657.38
Prob. > chi2		0.000		0.000

(1) The standard errors are estimated using the bootstrap method with 1,000 replications in the Heckman two-step selection models.

*, ** and *** represent statistical significance levels at 1%, 5% and 10%, respectively.

The econometric results from the second Heckman two-step selection model are parallel to the results of the first Heckman two-step selection model and provide empirical support in favour of the precautionary saving hypothesis. It is observed that the regression coefficients of household permanent income and real estate are positive and statistically significant as before. The regressions coefficients of the second business income risk variable (*BIRII*) have the expected positive sign and they are statistically significant in both household saving equations. Moreover, the regressions

coefficients of the dummy variables for the lack of health insurance and social security coverage are negative and statistically significant. Finally, the Inverse Mills Ratio (*lambda*) is statistically significant in both regressions, which confirms the choice of the Heckman two-step selection model to overcome the sample-selection bias issue in the empirical analysis.

The empirical analysis provides evidence in favour of this formulation of the precautionary saving hypothesis. It is observed that the business income risk variables (*BIRI* and *BIRII*) have the expected positive sign and are statistically significant in the household saving equations. The positive relationship between household saving and business income risk indicates that business-owners postpone their consumption expenditures and raise their saving level to be safeguarded against business income risk. Therefore, it is reasonable to consider the additional rise in household saving as precautionary saving in this context (Table V.12 and Table V.13).

It is observed that the econometric results are sensitive to the selection of the dependent variable. The sign of the business income risk variable is positive only if the empirical analysis is realised for the positive values of household saving (*LSAVI* and *LSAVII*). The regression coefficients of the business income risk variables (*BIRI* and *BIRII*) become negative and statistically insignificant, if the Heckman two-step selection models are estimated using both the negative and positive values of household saving (*LASAVI* and *LASAVII*). Moreover, the econometric results might also be indicating the importance of wealth accumulation in the analysis of risk and uncertainty.

It is observed that entrepreneurs' saving preferences are significantly different from the rest of the individuals in society (Table V.7). Entrepreneurs choose to invest in their businesses with a greater percentage than in any other saving option, which

might actually be more profitable for them in the long run. However, entrepreneurs, who choose to invest in their businesses, might seem as if they are in debt or they have negative savings in the short run.[49] It is possible that entrepreneurs use their own previous accumulated savings or they take credit from commercial banks and borrow money from their relatives to invest in their businesses. For this reason, it is necessary to consider the appreciation in the value of the enterprise in the measurement of entrepreneurial income (Hall, 2000). This is especially important for owners of small and medium sized enterprises, since it becomes more difficult to separate household finances from business investment for them (Gentry and Hubbard, 2000). Thus, it is difficult to estimate the impact of business income risk on their household saving decisions precisely without detailed information about their financial accounts, which is not available in the TURKSTAT Household Budget Surveys.

V.4 – Conclusion

The empirical analysis indicates the significance of business income risk for household saving decisions of business-owners. Thus, the empirical analysis provides support in favour of the precautionary saving hypothesis. It is observed that business income risk is one of the main determinants of household saving for business-owners and their families in Turkey. In addition to that business-owners do not appear to be influenced by any other social and demographic variable. One plausible explanation of this dilemma might be their wealth level, which ensures their well being under all

[49] In the TURKSTAT Household Budget Surveys, there is a question, which asks participants whether they have debt or not, but this question does not include household debt related to their businesses and enterprises.

circumstances, except for the risk component in their income process. Finally, the introduction of a proxy variable for business income risk is an important contribution of this empirical chapter.

However, there are several limitations of the empirical analysis in this chapter due to the structure of the TURKSTAT Household Budget Surveys.

I) One of the main limitations of the empirical analysis in this chapter is the presence of only two repeated cross-sectional household budget surveys. It is possible to gain an understanding of household consumption and saving behaviour from the TURKSTAT Household Budget Surveys. However, it is difficult to develop a proxy variable for business income risk, which is based on the volatility of entrepreneurial income, without a comprehensive panel-data set for several consecutive years.

II) Another important limitation is the lack of information about household debts of entrepreneurs in the TURKSTAT Household Budget Surveys. It is observed that entrepreneurs prefer to invest in their businesses with a greater percentage than any another saving option. However, it is not possible to find the monetary values of their business investment, which creates problems not only in the measurement of entrepreneurial income, but also entrepreneurs' household saving level (Hall, 2000).

III) Finally, risk preferences of entrepreneurs might be significantly different from the working class individuals and very important in their household saving decisions. Therefore, the econometric investigation process could be improved with the introduction of a proxy variable for the degree risk-aversion of entrepreneurs into the household saving regressions.

Precautionary saving is generally defined as the amount of financial wealth that households keep to be protected against future labour income uncertainty. However, it is argued that just as there are different types of risk and uncertainty in the economy, there are also different ways of generating precautionary savings. The previous empirical chapter discusses alternative strategies implemented by households such as income smoothing, when they are unable to raise their household saving ratio. On the other hand, this empirical chapter underlines that business investment is more important than accumulating financial wealth for entrepreneurs.

Moreover, households develop more efficient ways to ensure their welfare in an uncertain social and economic environment than simply accumulating financial wealth. Purchase of private health insurance is considered as a reliable alternative to performing precautionary saving for households, who might suffer from health expenditures risk. Therefore, the relationship between the purchase of private health insurance, health expenditures risk and household saving decisions is analysed in the following empirical chapter.

Chapter VI

Health Expenditures Risk, Purchase of Private Health Insurance, and Precautionary Saving

VI.1 – Introduction

The aim of this chapter is to analyse the influence of health expenditures risk on household consumption and saving behaviour in Turkey. In particular, I will analyse the relationship between health expenditures risk, the purchase of private health insurance by family members and household saving decisions. In the context of precautionary saving hypothesis, health expenditures risk is defined as the possibility of out-of-pocket health expenditures (Guariglia and Rossi, 2004, Starr-McCluer, 1996 and Chou *et al.*, 2003).

Health expenditures risk is related to the health costs rather than the changes in the health status of the individual. The possibility of becoming ill, which is based on the health conditions of the individual, is not the topic of health expenditure risk. The concept of health expenditures risk is restricted to the financial consequences of becoming ill such as doctor and hospital bills. Therefore, health expenditures risk is

defined as the possibility of out-of-pocket health expenditures in the context of the precautionary saving hypothesis.[50]

Health expenditures are one of the most significant issues of family life. The importance of health expenditures stems from its dependence on the demographic characteristics of the household. First of all, health is the primary issue for families with younger children. In this respect, it is possible to consider health expenditures as part of human capital investment. Secondly, health problems become an even more important source of concern for older family members. In the literature, generally the bequest motive is cited to explain the high saving rate of elderly people (Modigliani, 1986). However, the expectation of serious health problems might be a plausible explanation for this phenomenon (Deaton, 1992a).

The presence of health expenditures risk will have a significant influence on household consumption and saving behaviour. The impact of health expenditures risk on household saving decisions is further intensified, if the social security system is not sufficient to meet the needs of society. As a result of that, health care becomes a fundamental issue especially for families from developing countries. Households are forced to postpone their consumption and raise their saving level in order to cope with out-of-pocket health expenditures.

- The population growth rate remained well above 2 % annually for a long time period until the beginning of 1980s in Turkey, but it started to decrease slowly afterwards and dropped to 1.24 % in 2006. Although, the population growth

[50] The TURKSTAT Household Budget Surveys do not provide information about the health conditions of the individuals. Therefore, it would not be possible to estimate the health risk – the possibility of becoming ill – of an individual.

rate slowed down, which happened mainly during the last decade, it is still significantly high compared to the European countries.

- As a result of this positive trend, the Turkish society is quite young according to the European standards. For instance, it is observed from the TURKSTAT Household Budget Surveys that 62.5 % of the population is younger than 35 years of age.

- The steady growth of the population is accompanied by a high rate of internal migration from the rural regions to the urban regions. Employment prospects, the higher quality of public services such as health care, university education and better living conditions are important factors in this social change.

- It is estimated that almost half of the working population is working in the unregistered economy. Therefore, almost half of the working population does not have social security coverage as part of their employment contracts. These individuals are not only deprived of unemployment benefits and pension funds for the retirement period, but they also cannot benefit from public health care services.

All of the above factors underline the importance of the social security system for the well being of the individuals and their families in Turkey. A substantial part of society is exposed to out-of-pocket health expenditures due to the economic and social transformation of the country. It is observed from the TURKSTAT Household Budget Surveys that more than 30 % of the population does not have health insurance coverage. At this point, it is quite important to emphasise the fact that the income level of an important fraction of society is significantly low, which leaves them completely dependent on the social security measures for the poor people provided by

the state. For instance, it is seen that the percentage of *green-card owners* increased swiftly from 4.2 % in 2003 to 7.2% in 2004.[51] However, the quality of health care services in public hospitals is highly questionable, which leaves the financial burden of health care with the families. Thus, it is thought that health expenditures risk has a significant influence on household consumption and saving behaviour in Turkey.

There are only a few options available for households to safeguard themselves against health expenditures risk:

- To raise their saving level,
- To form large families to share the risk and pool their financial resources,
- To purchase private health insurance and
- To find employment with social security coverage and health insurance.

The options that are presented in the list above are not exhaustive or exclusive of each other. In reality, household members are capable of creating ingenious ideas to protect their families and life style. Hence, it is possible to implement a reasonable mixture of the available options to realise the desired good outcome for the family.

The empirical analysis in this chapter will contribute to the understanding of household consumption and saving behaviour under risk and uncertainty. The impact of health expenditures risk on household saving decisions might appear to be more significant than previously assumed in the literature. The identification of the most vulnerable segments of society to out-of-pocket health expenditures is the essence of the empirical analysis. The acquired knowledge about the influence of health

[51] Green-card owners are the poorest segment of society, who are not covered by any other social security system and they benefit from public health care services free of charge.

expenditures risk on household saving decisions in Turkey might provide key insight about household behaviour for many other developing countries.

VI.2 – Theoretical Background

The purpose of this section is to present a theoretical discussion from the viewpoint of the precautionary saving hypothesis about household saving decisions in the context of health expenditures risk. The precautionary saving hypothesis anticipates that households will raise their saving level, when there is the possibility of out-of-pocket health expenditures. In this framework, precautionary saving represents the additional amount of saving accumulated by households to safeguard themselves against health expenditures risk apart from household saving for life-cycle purposes such as the financing of consumption expenditures during the retirement period.

Precautionary saving might be in the form of financial assets, which is already liquid and can be used in times of need. However, it can also take the form of an investment in private health insurance, which guarantees that health expenditures of all family members will be financed comfortably in case of an emergency situation. It is thought that the need for precautionary saving will diminish, if the household already has a private health insurance scheme, which can cover health expenditures of all family members. Therefore, the precautionary saving hypothesis anticipates that there should be a direct and negative relationship between household saving decisions and the purchases of private health insurance.

VI.2.A – Purchase of Private Health Insurance and Precautionary Saving

The theoretical analysis of the influence of uncertainty on health economics and household welfare starts with the comprehensive discussion of Arrow (1963). The discussion aims to underline the essential features of the health economics from the point of view of the economic agent. The structure of the health industry shows significant differences compared to the rest of the economy. Above all, the health industry is part of the services sector and thus, it is significantly less competitive than the tradable goods sectors. Moreover, the presence of uncertainty with respect to health situation and medical treatment makes health insurance an integral part of the analysis.

Several empirical papers have investigated the relationship between household saving and the purchases of private health insurance under health expenditures risk. Starr-McCluer (1996) uses cross-sectional data from the Survey of Consumer Finances (SCF) for the U.S. economy for 1989. Starr-McCluer (1996) reached econometric results, which were not completely in support of the precautionary saving hypothesis. Starr-McCluer (1996) observed that there is a significant degree of risk of out-of-pocket health expenditures for many households. However, the empirical analysis revealed that households that face greater health expenditures risk do not build up higher amounts of saving compared to those, who face smaller health expenditures risk. In contrast to the predictions of the precautionary saving hypothesis, Starr-McCluer (1996) found that in fact there is a positive and significant relationship between household saving and the purchases of private health insurance.

Nevertheless, Starr-McCluer (1996) restricts her empirical analysis of the precautionary saving hypothesis only to the relationship between health expenditures risk and the purchases of private health insurance. However, an important factor in the decision-making process under health expenditures risk is the level of household wealth. The purchase of private health insurance can be considered as more economically sound for wealthier households, since they can afford to pay high insurance premiums. At the same time, the cost of health insurance can still be lower than out-of-pocket health expenditures for this group. However, poor households are completely dependent on public services, since they simply cannot afford to purchase either private health services or private health insurance. Therefore, the empirical analysis should concentrate on the behaviour changes of the most vulnerable segment of society to health expenditures risk.

Guariglia and Rossi (2004) analysed the relationship between household saving and private health insurance in the U.K. using the British Household Panel Survey (BHPS) from 1996 to 2000. The econometric analysis revealed a positive relationship between household saving and the purchases of private health insurance contrary to the anticipations of the precautionary saving hypothesis. Only in the rural regions of the country, where the quality of public health service is considered as low, there is a crowding-out effect of private health insurance purchases on household saving. However, in the case of Guariglia and Rossi (2004), the presence of a comprehensive public health insurance system the "*National Health Service*" in the U.K. seems to restrict the percentage of the individuals, who need and purchase private health insurance. In other words, the demand for private health insurance emerges when public health care system is not sufficient to meet the needs of society.

Chou *et al.* (2003) find that the provision of universal health care with the introduction of the National Health Insurance in Taiwan had a significant effect on household saving decisions. The National Health Insurance framework provided coverage for all households by the public health care system in the country for the first time. This was a major improvement for the Taiwanese society. It is observed that households accumulated additional amounts of saving for precautionary purposes against health expenditures risk. However, household saving decreased significantly among household groups, which were not covered by the public health care system previously, following this major policy change. The new policy framework eliminated the possibility of out-of-pocket health expenditures for many households.

The change in household behaviour following the introduction of National Health Insurance framework in Taiwan provides support for the precautionary saving hypothesis. The decline of household saving after the introduction of the new public health care policy is considered as empirical evidence that households reserved part of their saving against health expenditures risk.

VI.2.B – Household Saving Decisions under Health Expenditures Risk

The theoretical formulation of the precautionary saving hypothesis can be summarised with reference to the following reduced-form saving equation, which has been estimated by many empirical researchers previously (6.1).

$$\frac{W}{Y^P} = f\left(age, X, \tilde{u}\right) \tag{6.1}$$

The ratio of wealth to permanent income is dependent on the age-income profile of the individual, his/her social and demographic characteristics and finally, the uncertainty variable (Lusardi, 1998). However, for many individuals, family is the essence of social and economic life. Therefore, household wealth and household permanent income become the main economic variables in a reduced-form saving equation instead of individual variables in the analysis. Household saving is originally determined by household permanent income, household wealth together with social and demographic variables such as family characteristics and region (Guariglia, 2001 and Guariglia and Kim, 2003b).

The precautionary saving hypothesis can be presented in a formal manner in relation to the health expenditures risk as in the following equation (6.2). In this equation (6.2), S_h is household saving, Y_h^P is household permanent income, W_h is household wealth level and X_h is a matrix of social and demographic variables, which represent family characteristics. Finally, I_h is the dummy variable for the purchase of private health insurance by the household head, which is integrated into the household saving equation. The precautionary saving hypothesis suggests that there is a negative relationship between household saving and the purchase of private health insurance. In this respect, it is anticipated that the regression coefficient for the dummy variable I_h will be negative.

The purchase of health insurance is considered as evidence for the presence of health expenditures risk, which is the possibility of out-of-pocket health expenditures. The intuition behind this idea is that the individual decides to purchase private health insurance, if he/she thinks that there is health expenditures risk for him/her. Even though, the perception of health expenditures risk is a subjective evaluation and thus, the purchase of private health insurance is a subjective decision, it must depend on certain rational criteria. Therefore, it is necessary to analyse the purchase of private health insurance in the field of individual decision-making process under risk and uncertainty.

$$S_h = \alpha_h + \delta \hat{Y}_h^P + \vartheta W_h + \sum_{k=1}^{K} \beta_k X_h + \gamma I_h + \upsilon_h \tag{6.2}$$

The dummy variable for private health insurance I_i for the individual is a latent variable with two possible outcomes, which is observable only after its purchase is realised, see equation (6.3). The purchase of private health insurance is a complex decision, which is based on three main features of the individual:

i. The level of wealth

ii. The degree of risk-aversion and

iii. The social and demographic conditions.

However, these characteristic properties of the individuals directly influence household consumption and saving behaviour. Thus, the purchase of private health insurance is an endogenous variable in the analysis of household saving decisions. As

a result of that, the purchase of private health insurance and household saving become inter-related decisions, which are jointly determined.

$$I_i = 1 \Rightarrow \left(I_i^*(Z\beta + v) > 0\right)$$
$$I_i = 0 \Rightarrow \left(I_i^*(Z\beta + v) \leq 0\right) \quad (6.3)$$

The probability of having private health insurance can be estimated separately (6.4). I_i is the purchase of private health insurance and Z_i is matrix for the social and demographic conditions of the individual.

It is thought that the purchase of private health insurance mainly depends on the social security coverage. At the same time, the level of education, the choice of occupation and the employment status of the individual are significant factors on this decision. However, the endogeneity of the purchase of private health insurance in the household saving equation will require a *simultaneous equations* modelling approach in the empirical analysis.

$$I_i = \partial_i + \sum_{t=1}^{T} \beta_t Z_i + \nu_i \quad (6.4)$$

The precautionary saving hypothesis under health expenditures risk can be further developed. It is thought that if there is a constantly and seriously ill or a disabled person in the family, and then household saving will have to be greater to mitigate against the potential risk of making out-of-pocket health expenditures. The

presence of a constantly and seriously ill or a disabled person in the family might require more health care expenditures indirectly. Even if all members of the family are under the protection of a public or private health insurance, there might still be additional expenses that accrue to the family. For instance, if the only child of the family has allergic asthma, then the family will have to spend a greater sum of time and money on the child's room to keep it safe and clean. Moreover, the difficulties that disabled individuals have to face in their daily lives are hard to imagine for many of us. In particular, the infrastructure such as the public transportation system is not advanced to make life better for disabled individuals in developing countries.[52]

At the same time, this type of difficult situation will increase the probability of the purchase of private health insurance. It is thought that the presence of health insurance, which will cover health expenditures of all family members, will diminish the need for precautionary saving. Thus, it is expected that there will be a negative relationship between the purchase of private health insurance and household saving even if a member of the family is seriously ill and/or disabled.

VI.3 – Empirical Analysis

The purpose of this sub-section is to provide a brief descriptive analysis of the TURKSTAT Household Budget Surveys for a better understanding of household consumption and saving behaviour. The main aspects of the descriptive analysis will be family structure, labour force participation rate, social security coverage and health

[52] The percentages of disabled and seriously ill individuals in society are obtained from a question about labour force participation from the TURKSTAT Household Budget Surveys. More information about this question and the respective percentages are presented in the empirical analysis section.

insurance. The analysis will contribute to the identification of the sources of the health expenditure risk. The identification and the approximation of the health expenditure risk variable will be discussed in the following sub-section.

VI.3.A – A Descriptive Analysis of Household Budget Surveys

There are three main purposes of this sub-section:

1. To determine the empirical importance of household expenditures on health and education,
2. To identify the most vulnerable segment of society to out-of-pocket health expenditures and
3. To establish the relationship between labour force participation and health insurance coverage.

The percentages of sub-items of household consumption expenditures in total consumption expenditures are calculated using data from the TURKSTAT Household Budget Surveys (Table VI.1). It is observed that household expenditures on health and education are quite small compared to expenditures on other items such as durable goods. The low ratio of health and education expenditures might be related to the low-income level of households in Turkey. However, this observation also indicates that human capital investment is quite low at the household level. Therefore, this situation requires more responsibility and effort on behalf of the government and society for the development of the country.

The distribution of household consumption expenditures to its sub-items is presented at the Table VI.1 below. It is observed that compulsory expenditure groups, which include food and beverages, housing and rent and transportation, constitute more than 60 % of total household consumption expenditures. However, the total share of household expenditures on health and education, which can be linked to private investment in human capital formation, in total expenditures is slightly higher 4 %. The significantly low level of household expenditures on health and education raises concerns about the future of society. Moreover, the shares of culture and entertainment and education expenditures are lower in the rural regions compared to the urban regions as expected.

Table VI.1 – The Distribution of Household Consumption across Regions (%)

Expenditure Groups	Turkey		Urban		Rural	
	2003	2004	2003	2004	2003	2004
Food and Beverages	27.5	26.4	24.1	23.1	36.4	35.4
Alcoholic Drinks	4.1	4.3	3.8	4.0	5.1	5.3
Clothing and Shoes	6.2	6.5	6.2	6.5	6.5	6.5
Housing and Rent	28.3	27.0	30.2	29.1	23.1	21.4
Furniture & House Supplies	5.7	6.6	5.7	6.5	5.9	6.9
Health	2.2	2.2	2.1	2.2	2.4	2.2
Transportation	9.8	9.5	10.3	9.6	8.2	9.2
Communications	4.3	4.5	4.4	4.6	4.0	4.1
Culture and Entertainment	2.2	2.5	2.5	2.8	1.5	1.5
Education	2.0	2.1	2.3	2.4	1.1	1.2
Hotels and Restaurants	4.1	4.5	4.6	5.0	2.9	3.2
Various Goods & Services	3.5	3.9	3.8	4.2	2.9	3.1
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: TURKSTAT Household Budget Surveys

At the same time, there are significant differences in the distribution of household consumption expenditures to its sub-items across regions. The differences in shares of sub-items might stem from the gap in income level and dissimilar life-

styles, which influence household behaviour. For instance, the ratio of expenditures on food and beverages to total expenditures is more than 10 % higher, while expenditures on housing and rent is around 7 % lower in the rural regions compared to the urban regions. Therefore, it is reasonable to expect to find differences in household saving decisions and also in the forms of household saving across regions.[53]

On the other hand, the distribution of household consumption expenditures across income groups reveals that the percentage of health expenditures remains the same across income quintiles (Table VI.2). Although, the number of private hospitals increased considerably in the recent years, the expenditures are actually financed by the government from the centralised public sector budget. In other words, the role of the private sector in the health services increased significantly during this period, but the financial burden of the improvement in the health services is mainly assumed by the public sector.

However, the situation is different for household expenditures on education. It is observed that the share of expenditures on education in total expenditures increases as the level of household income rises. The share of education expenditures continues to increase at a modest rate from previous years. Nevertheless, its share is only 3.3 % even for the richest income quintile and for the poorest income quintile it is just 0.5 % in 2004. The role of the public sector in education is very important, but it is also understood that households' perception of education charged in the recent years. Household awareness, that education is the most important factor in employment

[53] One of the main problems of the empirical analysis is the definition of rural region in the TURKSTAT Household Budget Surveys. A settlement unit like a town or village is categorised as rural region, if its population is smaller than 20,000 individuals. However, this definition does not take into account economic activities such as agricultural and industry and also the quality of public services, i.e. schools and hospitals, which might be even more important.

prospects, which provides for social security coverage and pension funds, might have increased during this period.

Table VI.2 – The Vertical Distribution of Household Consumption across Income Quintiles (%)

Expenditure Groups	Turkey									
	1. % 20		2. % 20		3. % 20		4. % 20		5. % 20	
	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004
Food and Beverages	40.6	40.0	35.9	34.2	32.3	29.8	28.1	26.0	19.5	19.3
Alcoholic Drinks	5.3	5.1	4.9	5.0	4.7	5.0	4.5	4.4	3.2	3.5
Clothing and Shoes	4.6	5.2	5.6	5.7	5.7	6.1	6.4	6.6	6.9	7.2
Housing and Rent	29.7	27.6	30.2	29.1	29.7	28.5	28.6	27.3	26.7	25.2
Furniture & House Supplies	4.1	4.9	4.8	5.6	5.6	6.9	6.1	6.8	6.2	7.2
Health	2.3	2.4	2.1	2.2	2.3	2.0	1.8	2.1	2.4	2.4
Transportation	4.2	4.2	5.5	5.5	6.5	7.0	8.8	9.3	14.3	13.3
Communications	3.0	3.1	3.6	4.1	4.0	4.2	4.5	4.6	4.8	5.0
Culture and Entertainment	0.9	1.2	1.1	1.4	1.5	2.0	1.9	2.2	3.3	3.5
Education	0.3	0.5	0.7	0.9	1.0	1.2	1.5	2.1	3.4	3.3
Hotels and Restaurants	2.9	2.7	3.2	3.7	3.9	3.8	4.4	4.6	4.7	5.4
Various Goods & Services	2.2	3.3	2.4	2.6	3.0	3.4	3.3	4.0	4.5	4.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: TURKSTAT Household Budget Surveys

On the other hand, it is observed that the majority of household expenditures on health, culture and entertainment and education are realised by the higher income groups. The highest income quintile performed 40.3 % of total health expenditures and 59.6 % of total education expenditures, whereas the poorest income quintile made only 9.5 % of total health expenditures and 2.3 % of total education expenditures in 2004 (Table VI.3). This situation indicates that despite the positive trend during the recent years the income distribution in the country is still problematic.

Table VI.3 – The Horizontal Distribution of Household Consumption across Income Quintiles (%)

Expenditure Groups	Turkey											
	1. % 20		2. % 20		3. % 20		4. % 20		5. % 20		Total	
	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004
Food and Beverages	13.1	13.7	16.9	16.8	19.5	19.4	22.2	22.4	28.2	27.7	100.0	100.0
Alcoholic Drinks	11.3	10.7	15.3	15.1	18.8	19.8	23.5	23.4	31.0	31.1	100.0	100.0
Clothing and Shoes	6.4	7.2	11.6	11.4	15.3	16.1	22.4	23.1	44.2	42.2	100.0	100.0
Housing and Rent	9.3	9.3	13.8	13.9	17.5	18.2	22.0	23.0	37.5	35.6	100.0	100.0
Furniture & House Supplies	6.4	6.6	10.8	11.0	16.2	18.0	23.2	23.2	43.4	41.1	100.0	100.0
Health	9.1	9.5	12.4	12.8	17.3	15.7	17.8	21.7	43.5	40.3	100.0	100.0
Transportation	3.8	4.1	7.3	7.5	11.0	12.7	19.6	22.3	58.2	53.5	100.0	100.0
Communications	6.2	6.2	11.0	11.9	15.4	16.1	23.0	23.5	44.5	42.3	100.0	100.0
Culture and Entertainment	3.5	4.2	6.7	7.2	11.7	14.3	18.7	19.9	59.5	54.4	100.0	100.0
Education	1.2	2.3	4.5	5.4	8.3	10.2	16.9	22.5	69.1	59.6	100.0	100.0
Hotels and Restaurants	6.2	5.4	9.9	10.6	15.5	14.7	23.0	23.1	45.5	46.1	100.0	100.0
Various Goods & Services	5.5	7.6	8.7	8.8	14.1	14.9	20.5	23.5	51.2	45.3	100.0	100.0
Total	8.8	9.1	13.0	12.9	16.7	17.2	21.7	22.7	39.8	38.0	100.0	100.0

Source: TURKSTAT Household Budget Surveys

Compulsory public health insurance is the most common and important type of health insurance in Turkey. It is observed from the household budget surveys that around 60 % of the individuals have compulsory health insurance both for themselves and for their family members in relation to their employment contracts (Table VI.4). Individuals such as civil servants, workers from the registered economy and salary-earners in public and private firms gain health insurance coverage for themselves and for their family members. In addition to that, their social security institution finances their retirement pension and health expenditures. For instance, if the household head is employed in the registered economy, then all health expenditures in his/her family will be covered by the compulsory health insurance scheme as a result of his/her employment contract. However, the individuals might be expected to contribute up to a certain percentage of health expenditures for medicine and hospital stay.

On the other hand, just a small percentage of society can actually benefit from free public health services. Only individuals, who do not have any health insurance coverage and membership to any social security institution, can apply for a *green-card* to benefit from free public health services.[54] The individual has to prove that his/her income level is below the officially determined poverty line and does not have any form of social security coverage to obtain a green-card.

Table VI.4 – Health Insurance Coverage of Individuals

	2003		**2004**	
	Number	*Ratio (%)*	*Number*	*Ratio (%)*
Compulsory Insurance	62,544	58.12	20,257	57.24
Voluntary Insurance	1,082	1.01	575	1.62
Both Comp. & Vol. Insurance	956	0.89	1,148	3.24
*Green-Card Holder **	4,490	4.17	2,555	7.22
Without Health Insurance	38,542	35.82	10,853	30.67
Total	107,614	100.00	35,388	100.00

Source: TURKSTAT Household Budget Surveys
* The public health care system for the poorest segment of society, which is not covered by any other social security system.

Voluntary insurance involves the purchases of private health insurance by individuals, which is the smallest group within the health insurance categorisation for individuals. However, the percentage of individuals, who purchase private health insurance, is increasing over time despite the fact that most of them already have health expenditures coverage thanks to their employment contracts.

According to the TURKSTAT Household Budget Surveys, more than 30 % of the population does not have health insurance coverage (Table VI.4). For this reason,

[54] The green-card application requirements are determined by the Green-Card Law 3816, which was passed in 1992. First, the individual must not have any social security or health insurance coverage and he/she must be unable to pay for his/her health care expenditures. Second, he/she must prove that another family member does not provide social security or health insurance coverage for him/her. Finally, monthly disposable income of the individual must be lower than one third of the minimum wage. The individual will acquire a green-card from the local authorities and the State will finance his/her health care expenditures until the implementation of National Health Insurance provided that the conditions above are satisfied.

a substantial proportion of society has to finance all health expenditures by themselves without any assistance from the state. In other words, this segment of society does not have any type of protection against health expenditures risk apart from household saving and support from relatives and charity institutions. However, it is observed that members of this group are less-educated individuals from low-income families (Table VI.5).

Table VI.5 – Health Insurance with respect to the Level of Education [(1) (2)]

	Illiterate	Literate	Primary School	Secondary School	High School	University Degree	Total
Compulsory	6,369	14,902	3,0112	5,384	13,626	5,283	75,921
Voluntary	214	325	594	89	222	58	1,504
Both Comp. & Vol.	198	457	787	113	266	99	1,929
Green-card	1,371	1,937	2,216	224	228	3	5,979
No Health Insurance	6,761	11,512	17,982	2,215	3,942	485	42,903
Total	14,913	29,133	51,691	8,025	18,284	5,928	128,236

Source: TURKSTAT Household Budget Surveys
(1) It includes all individuals in society, who are at the age of 6 and above.
(2) There are only 262 individuals with a Post-graduate degree in the pooled sample and 245 of them have compulsory health insurance, while 2 of them have voluntary health insurance and 9 of them have both compulsory and voluntary health insurance. None of the individuals with a Post-graduate degree has a green-card as expected.

It is observed from household budget surveys that the green-card holders are not only the poorest individuals, but they are also the least educated people in society. Almost none of the household heads, who own a green-card, have a high school or university degree. This fact also explains why their income level is too low and they are completely dependant on free public health care services. Hence, these individuals and their families represent the most vulnerable segment of society to health expenditures risk.

The most significant observation on the discussion of health insurance is the fact that health insurance coverage depends on choice of occupation for the majority

of the individuals. Thus, it is necessary to consider labour market developments in the analysis of household saving decisions under health expenditures risk. Moreover, risk-averse individuals might take into account the prospect of health insurance in their choice of occupation, which might lead to *self-selection bias* in the econometric analysis.

It is observed that only 40 % of the individuals, who are at the working age of 12 and above, are actually employed in Turkey. It is reasonable to assume that a working member of the family provides support for health expenditures of the entire family considering the fact that employment is the main source of health insurance. In particular, the presence of small children will increase the importance of the choice of occupation for the household head all the more because of the need for health insurance (Table VI.6).

Table VI.6 – Labour Force Participation for Individuals *

	2003		**2004**	
	Number	*Ratio (%)*	*Number*	*Ratio (%)*
Employed	33,637	40.54	10,961	40.18
Searching for a Job	3,628	4.37	1,206	4.42
Out of the Labour Force	45,706	55.09	15,112	55.40
Total	82,971	100.00	27,279	100.00

Source: TURKSTAT Household Budget Surveys
* Labour force includes individuals, who are at age of 12 and above.

On the other hand, more than half of the individuals are not actively searching for jobs (Table VI.7). Hence, the labour force participation rate remains at only 45 %. Although the observed unemployment rate from the household budget surveys is almost 12 %, it could be even higher if the labour force participation rate was greater. The labour force participation rate is quite low for a developing country with such a young population.

It is observed that a significant number of the individuals in society are not working in the current month, but also they are not searching for jobs (Table IV.7). Therefore, it is not correct to define them as unemployed individuals. In fact, they do not wish to participate in the labour force. In the TURKSTAT Household Budget Surveys, there is a special question to learn the reasons behind their choice. This particular question also provides information about the percentages of disabled and seriously ill individuals in society (Table IV.7).

Table VI.7 – Reasons for Being out of the Labour Force for Individuals

	2003		**2004**	
	Number	*Ratio (%)*	*Number*	*Ratio (%)*
Waiting to start for a job	96	0.21	18	0.12
Student	11,828	25.88	3,891	25.75
Housewife	19,743	43.20	6,939	45.92
Retired	5,379	11.77	1,839	12.17
Rent or interest income earner	62	0.14	17	0.11
Old (aged 60 and above)	4,272	9.35	930	6.15
Disabled	467	1.02	179	1.18
Seriously ill	565	1.24	209	1.38
Family and personal reasons	1,841	4.03	533	3.53
Seasonally employed	264	0.58	80	0.53
Other reasons	1,189	2.60	477	3.16
Total	45,706	100.00	15,112	100.00

Source: TURKSTAT Household Budget Surveys

The reasons for being out of the labour force for individuals are presented in Table VI.5. Housewives constitute the largest category in both years in this group and the percentage of housewives is even greater than the total of students, retired and old people in 2004. The percentages of sick and disabled individuals, who are of working age but cannot participate in the labour force, are actually quite small. The sum of seriously ill and disabled people makes up only 2.5 % of the total number of individuals, who do not participate in the labour force, even though they are of the working age. However, the percentage of individuals, who are not in the labour force

because of family and personal reasons, is also significant and higher than all the other remaining categories.

Interestingly, the female labour force participation rate is limited both in the urban and rural regions of the country. However, the female labour force participation rate rises with the level of education. It is especially the case for university graduates, since their labour force participation rate is very close to that of men unlike the rest of the education groups. It might be a positive development to promote the participation of women in the labour force in order to improve the quality and competitiveness of the labour market. It is understood that the best technique to achieve this aim is to raise the education level of women in society in Turkey.

The comparison of the health insurance categories with the distribution of individuals to the economic sectors indicates that the number of individuals without health insurance coverage is highest in the agricultural sector. It is followed by the service sector, but individuals without health insurance comprise a limited percent of total employment in the service sector. The number of uncovered individuals reaches almost half of total employment in the construction sector (Table VI.8).

Table VI.8 – Sector Distribution of Health Insurance of Working Individuals

	Agriculture	**Industry**	**Service**	**Construction**	**Total**
Compulsory	4,537	5,860	12,602	1,752	24,751
Voluntary	170	51	86	31	338
Both Comp. & Vol.	231	93	234	108	666
Green-card owner	1,064	216	466	231	1,977
No Health Insurance	9,974	1,793	3,677	1,422	16,866
Total	15,976	8,013	17,065	3,544	44,598

Source: TURKSTAT Household Budget Surveys (Pooled Sample)

It is clearly seen that the most vulnerable group to health expenditures risk in society is the unpaid family workers, who are employed in the agricultural sector in

the rural regions of the country. The unskilled workers in the construction sector constitute another sensitive group, which is exposed to the risk of out-of-pocket health expenditures. At the same time, the size of the unregistered economy is significant in these sectors, which might lead to the employment of workers without social security coverage.

Table VI.9 – Health Insurance Coverage across Occupational Groups [(1) (2)]

	Salary-Earner	**Wage-Earner**	**Employer**	**Self-Employed**	**Family Worker [(3)]**
Compulsory	15,133	896	1,739	4,400	2,558
Voluntary	78	58	10	98	94
Both Comp. & Vol.	156	20	89	286	115
Green-card	317	435	20	576	628
No Health Insurance	3,023	2,371	430	4,429	6,602
Total	18,707	3,780	2,288	9,789	9,997

Source: TURKSTAT Household Budget Surveys (Pooled Sample)
(1) It includes all working individuals.
(2) The number of observations for the apprentice group is significantly small (only 37 obs.) and for this reason, it is not reported in the above table.
(3) Family workers are unpaid workers, who support their family business, i.e. farms.

The choice of occupation is one of the most important determinants of health insurance coverage, since as previously mentioned compulsory health insurance is the most common health insurance type in Turkey, which is provided for individuals as a result of their employment contracts. Therefore, the choice of occupation and private health insurance are inter-related decisions. For instance, more risk-averse individuals might search for employment with health insurance coverage and purchase private health insurance at the same time.

The distribution of health insurance and social security coverage for household heads across regions are presented in the Table VI.10. The numbers and ratios of household heads, which do not have health insurance and social security coverage, are shown for both years. It is observed that the ratio of household heads without health

insurance climbs to 40 %, whereas the ratio of households without social security coverage reaches almost 50 % of total household heads in the rural regions of the country.

Table VI.10 – Health Insurance and Social Security for Household Heads

	2003				**2004**			
	Without Health Insurance		*Without Social Security*		*Without Health Insurance*		*Without Social Security*	
	Number of Obs.	*Ratio (%)*	*Number of Obs.*	*Ratio (%)*	*Number of Obs.*	*Ratio (%)*	*Number of Obs.*	*Ratio (%)*
Rural	3,175	42.41	3,979	48.82	947	37.01	1,244	48.61
Urban	3,551	19.43	4,171	22.82	925	15.46	1,283	21.44
Total	6,726	26.11	8,150	31.63	1,872	21.91	2,527	29.58

Source: TURKSTAT Household Budget Surveys (Household Heads)

In a similar fashion, social security coverage is provided as part of their employment contracts for the individuals. The social security system is governed by the state and only a minority of the individuals purchase private retirement insurance and pay premiums to private pension funds. It is expected that the relevant social security institution will guarantee both health insurance and retirement benefits for the member individuals. However, it is possible that the individual might enjoy health insurance even if a social security institution does not provide coverage for him/her as a result of his/her employment contract. For instance, a retired person can work part-time in the informal economy and still have health insurance coverage from his/her previous job. Therefore, it is observed that health insurance coverage ratios are larger than social security coverage ratios in society.

Traditionally, it is the household head, who provides for all the needs of the family, especially in the rural regions of the country. Therefore, it is reasonable to assume that the family suffers from the lack of health insurance and social security coverage together with the household head. Health insurance and social security

coverage ratios are significantly higher in the urban regions compared to the rural regions. The high internal migration rate towards the urban regions might be partially explained by the lack of public services in the rural regions of the country (Table VI.10).

The distribution of health insurance coverage of household heads with respect to their status in the labour market follows a close pattern in both survey years. For this reason, this distribution is presented using values from the pooled sample set (Table VI.11). It is observed that compulsory health insurance, which comes with the employment contract, is the most common type for employed household heads. However, a significant fraction of them are still working without health insurance coverage, which denotes the importance of the unregistered economy.

Table VI.11 – Health Insurance Coverage for Household Heads (Pooled Sample)

	Employed		**Out of Labour Force**		**Searching for a Job**	
	Number of Obs.	*Ratio (%)*	*Number of Obs.*	*Ratio (%)*	*Number of Obs.*	*Ratio (%)*
Compulsory	15,487	64.7	7,777	81.5	215	26.1
Voluntary	167	0.7	147	1.5	17	2.1
Comp. & Vol.	452	1.9	129	1.4	5	0.6
Green-card owners	978	4.1	259	2.7	77	9.4
No Health Insurance	6,854	28.6	1,235	12.9	509	61.8
Total	23,938	100.0	9,547	100.0	823	100.0

Source: TURKSTAT Household Budget Surveys (Household Heads)

At the same time, it is observed that household heads, who do not participate to the labour market, have a higher degree of compulsory health insurance coverage compared to the other categories. The household head will benefit from compulsory health insurance coverage during the retirement period in addition to pension funds. On the other hand, only a small proportion of household heads from this category does not have health insurance coverage.

The situation completely changes when the analysis concentrates on household heads, who are actively searching for a job. Only, a small fraction of unemployed household heads has compulsory health insurance coverage and a significant majority of them are actually left without any type of health insurance. The most important aspect is the fact that the ratio of household heads, who own a green-card to cover their health expenditures, rises dramatically within this category. The importance of this observation is that it suggests a direct link between the choice of occupation and health expenditures risk. It is reasonable to assume that a job-opportunity in the registered economy provides more than just labour income.

The analysis of household budget surveys indicates that the percentage of voluntary health insurance is very small for all categories. Moreover, it is observed that household expenditures on the purchases of private insurance including health insurance are limited. The preliminary analysis presents a rather weak link between household saving decisions and the purchase of private health insurance under health expenditures risk.

There are three main findings of the descriptive analysis of the TURKSTAT Household Budget Surveys for 2003 and 2004:

1. The high internal migration rate stems from the better quality of public services such as health care in the urban regions,
2. The level of education plays an important role in employment prospects, which also provides for health insurance coverage and
3. The most vulnerable segments of society to health expenditures risk are
    a) unpaid family workers, who are employed in the agricultural sector in the rural regions,

b) disabled and seriously ill individuals, who cannot work and

c) finally, housewives constitute the largest category.

VI.3.B – Econometric Investigation Process

It is observed that families, whose household head has both compulsory and voluntary health insurance, have the highest saving level. This observation might suggest to their high wealth level as well as their more risk-averse preferences. On the other hand, the mean of household saving is negative only for green-card owners, which clearly indicates that their economic and socially difficult conditions.[55] The mean level of household saving is positive even for families, whose household head does not have health insurance coverage (Table VI.12).

Table VI.12 – Household Saving (SAVI) with respect to Health Insurance
(*YTL., 2003 prices*)

	Obs.	Mean	Std. Dev.	Min.	Max.
Compulsory	23,479	2,198.9	9,923.5	-119,967.5	399,010.8
Voluntary	331	1,642.3	6,669.2	-45,806.5	54,597.8
Both Comp. & Vol.	586	4,219.8	13,271.6	-52,314.6	194,912.3
Green-card	1,314	-250.7	3,385.8	-77,728.4	18,447.9
No Health Insurance	8,598	772.0	5,305.1	-62,438.2	109,371.3
Total	34,308	1,776.6	8,885.3	-119,967.5	399,010.8

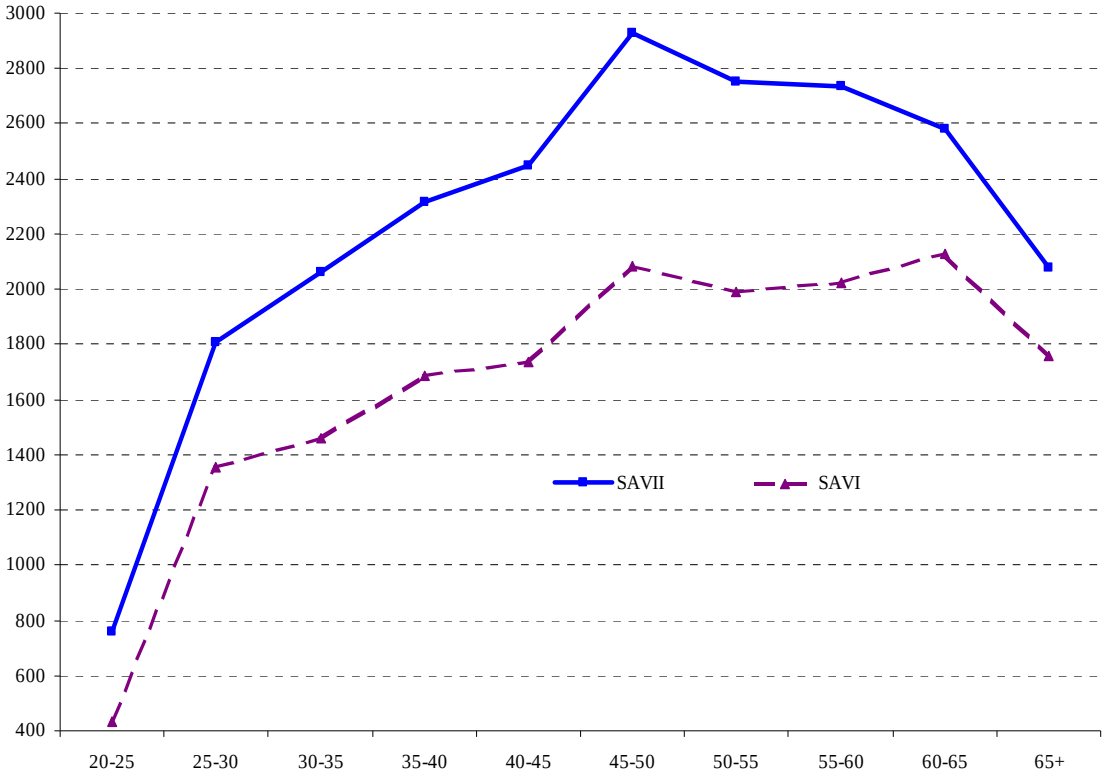
Source: TURKSTAT Household Budget Surveys (Household)

The evolution of household saving with respect to age cohorts is presented in Figure VI.1. It is observed that SAVII is significantly higher than SAVI for all cohort groups by definition, but interestingly it is also shown that the difference between the

[55] It is probable that some of the green-card owners may have underreported their disposable income.

two saving variables is widened for the middle-age groups and reduces as the household head approaches to the retirement age. This divergence might stem from the life-cycle behaviour of households, since for instance individuals start to invest in housing after a certain age such as 35 or 40. Moreover, household saving has a hump-shape and follows a pattern, which is similar to the assertions of the Life-Cycle Theory of Saving (Modigliani and Brumberg, 1954).

Figure VI.I – Household Saving with respect to the Age of the Household Head
(*YTL., 2003 prices*)



Source: TURKSTAT Household Budget Surveys (Households)

VI.3.B.a – Estimation Methodology

The advantage of the TURKSTAT Household Budget Surveys is that there is information about the type of health insurance and social security coverage of the

individuals. This situation presents a unique opportunity to determine the underlying causes of the purchase of private health insurance. It is possible to find the differences in each category by performing a probit regression for each of them separately. This approach will reveal the differences among the social classes as well as the perception of the degree of health expenditures risk among the individuals.

Household saving and the purchase of private health insurance are inter-related decisions, especially for more risk-averse individuals. For instance, more risk-averse individuals are more likely to search for employment in the public sector, since social security benefits including health expenditures are more generous for civil servants and purchase private health insurance at the same time. Thus, the purchase of private health insurance becomes an endogenous variable in the household saving equation, which leads to the emergence of simultaneous equations bias.

In the second step of the process, the dummy variables for the type of health insurance of the household heads are created and then introduced into the household saving equation (6.2) to capture the impact of health expenditures risk on household saving decisions. A similar microeconomic approach has been previously followed by Starr-McCluer (1996), who actually used an OLS estimation technique. In this case, if the household saving equation is performed without taking the simultaneous equations bias into consideration, the regression coefficient estimates will be inconsistent. On the other hand, the permanent income variable is already obtained by acquiring the fitted values from the Heckman two-step selection model to avoid the possibility of simultaneous equations bias in the household saving equation.

The estimation methodology of the household saving equation is a *two-stage probit least squares regression* (2SPLS), since the dummy variable for type of health insurance is a binary variable with only two possible values (0 and 1), whereas

household saving is a continuous variable.[56] In order to overcome the simultaneous equations bias, the probability of having health insurance coverage is estimated with a probit model, while household saving is estimated by the least squares regression. The fitted values from the first stage are used at the second stage of the regression. Finally, the regression coefficients for the household saving equation are presented with the corrected standard errors.[57]

VI.3.B.b – Econometric Results

The dependant variables in the empirical analysis are the different logarithmic transformations of household saving (*SAVI* and *SAVII*), which are adjusted because of the highly skewed distribution of household saving (Gropp *et al.*). The explanatory variables are mostly comprised of dummy variables for the social and demographic features of households. The main economic variables are the logarithmic values of household permanent income, which is already estimated in the first empirical chapter and the logarithmic values of real estate ownership, which represents the overall housing wealth of the family.

The econometric analysis starts with the regression of the household saving on the dummy variables for household heads without health insurance and social security coverage along with economic, social and demographic variables. The econometric results indicate that household saving level decreases for families; whose household heads do not have health insurance and social security coverage. It is observed that

[56] See Keshk (2003).
[57] The standard errors are corrected in the second stage, since the standard errors from the joint model are based on the fitted values, which are acquired from the first stage. Therefore, the standard errors are adopted according to the original variable values at the end of the second stage.

there is a negative relationship between household saving and the dummy variables for household heads without health insurance and social security coverage. Therefore, it is reasonable to argue that out-of-pocket health expenditures create a heavy burden on household finances (Table VI.13).

The observations of seriously ill and disabled individuals are taken from the individuals' labour force participation choices, which are presented in Table VI.7 in the previous section. The influence of the presence of seriously ill and disabled individuals in the family on household saving decisions is analysed using pooled OLS and Tobit regressions. Moreover, the dummy variables for the presence of seriously ill and disabled individuals in the family are interacted with the dummy variable for voluntary health insurance and these interaction terms are included in the household saving regressions. It is observed that there is a negative relationship between the interaction terms and household saving, but it is seen that the regression coefficients of the interaction terms are not statistically significant. However, it is necessary to mention the number of observations for the interaction terms is very small, which might create inference problems in the estimation process. Therefore, the econometric results are not presented in full in this chapter.[58]

[58] It is observed that the presence of a seriously ill and/or disabled person in the family has a negative effect on household saving in accordance with the initial expectations. Its influence on household saving is similar to the lack of health insurance and social security coverage in the family. It leads to the fall in household saving by raising out-of-pocket health expenditures. Therefore, especially the presence of a disabled person in the family definitely increases health expenditures risk. It is thought that the necessity to own health insurance coverage either public or private should increase under these circumstances. Moreover, the regression coefficients of the dummy variables for all health insurance categories are still sizeable and statistically significant at the same time. Consequently, two interaction terms are developed to capture the joint impact of private health insurance ownership and the presence of a seriously ill and/or disabled person in the family on household saving decisions. The econometric results reveal that there is a negative relationship between the interaction terms and household saving. However, it is observed that the interaction terms are not statistically significant in the household saving equations. The limited number of observations for the interaction terms might be an obstacle in the estimation process, since there are only 8 disabled individuals and 17 seriously ill individuals, who have private health insurance in the pooled sample.

Table VI.13 – Household Saving and Health Insurance Coverage [(1)]

	Pooled OLS Regression		*Pooled Tobit Regression (censored from left)*	
	LASAVI	**LASAVII**	**LSAVI**	**LSAVII**
	Coefficient	*Coefficient*	*Coefficient*	*Coefficient*
Explanatory Variables	*Std. Err.*	*Std. Err.*	*Std. Err.*	*Std. Err.*
Household Permanent Income	0.076*	0.078*	0.034*	0.035*
	0.006	0.006	0.001	0.001
Real Estate	0.170*	0.183*	0.047*	0.047*
	0.010	0.009	0.002	0.002
Nuclear Family	0.255	0.169	0.031	-0.017
	0.534	0.510	0.122	0.119
Traditional Family	0.935	1.054***	0.087	0.005
	0.584	0.558	0.130	0.125
Single Parent Family	0.690	0.447	-0.149	-0.215***
	0.550	0.546	0.128	0.128
Compulsory Health Insurance	2.022*	2.487*	0.690*	0.729*
	0.131	0.128	0.031	0.028
Voluntary Health Insurance	1.766*	2.050*	0.349*	0.431*
	0.453	0.402	0.096	0.094
Both Comp. & Vol. Health Insurance	3.013*	3.287*	1.048*	1.017*
	0.335	0.312	0.077	0.074
Green-card	-0.911*	-1.000*	-0.509*	-0.505*
	0.218	0.228	0.055	0.053
No Social Security Coverage	0.393*	0.476*	0.159*	0.164*
	0.128	0.119	0.028	0.026
Children < 18	0.038	0.015	0.067	0.030
	0.518	0.495	0.119	0.117
Children > 18	-0.667	-0.733	-0.062	-0.110
	0.525	0.499	0.120	0.117
Rural Regions	-0.235**	-0.332*	-0.173*	-0.194*
	0.098	0.089	0.022	0.021
Dummy 2004	-0.160***	0.112	0.110*	0.114*
	0.095	0.092	0.020	0.020
Constant	-1.390*	-1.080**	6.148*	6.208*
	0.528	0.515	0.123	0.121
Number of obs.	30,394	30,394	19,522	20,920
R-squared / (Pseudo R-squared)	0.035	0.050	0,036	0.039
Adj. R-squared	0.035	0.050	-	-
Wald chi2(14)	1,257.02	1,559.69	2,598.89	2,963.43
Prob. > chi2	0.000	0.000	0.000	0.000

(1) The standard errors are estimated using the bootstrap method with 1,000 replications in the pooled OLS and Tobit regressions.

*, ** and *** represent statistical significance levels at 1%, 5% and 10%, respectively.

The econometric analysis develops with the exploitation of specific dummy variables for different types of health insurance for household heads. The econometric results for the first definition of household saving (*LASAVI*) from the pooled two-stage probit least squares (*2SPLS*) regressions with corrected standard errors are presented in Table VI.14.

The econometric results of the least squares regression of household saving and the probit model for the probability of having a certain type of health insurance coverage are shown at the second to sixth columns of the Table VI.14. It is observed that the dummy variables for having compulsory health insurance and also having both compulsory and voluntary health insurance at the same time are positive and statistically significant in the household saving regression. It is thought that these two categories belong to the same segment of society. It is observed that families, whose household head have both compulsory and voluntary health insurance at the same time, also have the highest level of household saving in society.

On the other hand, the dummy variables for having voluntary health insurance, which includes the purchases of private health insurance, green-card ownership and not having health insurance coverage are negative and statistically significant in the household saving regression. It is found that there is a negative relationship between household saving and the purchases of private health insurance as proposed by the precautionary saving hypothesis. Moreover, it is thought that the finance of health expenditures by the sector provides relief for poor families. Instead, households from the poorest segment of society might direct their expenditures to different goods and services such as food and clothing under these difficult circumstances. In fact, the change in the consumption emphasis will be positive both for the families and human capital development of the country.

Table VI.14 – Two-Stage Probit Least Squares Regressions (2SPLS) of LASAVI

OLS Regression					
Explanatory Variables	**Compulsory**	**Voluntary**	**Both Comp. & Vol.**	**Green-card**	**No Health Insurance**
	Coefficient	*Coefficient*	*Coefficient*	*Coefficient*	*Coefficient*
	Std. Err.	*Std. Err.*	*Std. Err.*	*Std. Err.*	*Std. Err.*
Health Insurance	0.587*	-1.771*	1.732*	-0.998*	-0.409*
	0.028	0.225	0.121	0.080	0.027
Household Permanent Income	0.079*	0.078*	0.066*	0.082*	0.080*
	0.006	0.009	0.008	0.006	0.006
Real Estate	0.168*	0.225*	0.152*	0.158*	0.180*
	0.009	0.015	0.013	0.011	0.009
Nuclear Family	0.523**	7.867*	-7.636*	0.376	0.482
	0.499	1.299	0.942	0.569	0.519
Traditional Family	1.206***	8.453*	-6.764*	0.944	1.113***
	0.555	1.354	1.001	0.633	0.578
Single Parent Family	1.006	8.708*	-7.436*	1.019***	1.011***
	0.541	1.368	0.981	0.616	0.564
Children < 18	0.313	7.060*	-7.927*	0.114	-0.057
	0.485	1.280	0.924	0.551	0.505
Children > 18	-0.433	6.587*	-8.602*	-0.336	-0.563
	0.487	1.280	0.930	0.552	0.506
Rural	-0.027	-0.511*	-0.511*	-0.172***	-0.147
	0.096	0.136	0.126	0.104	0.098
Dummy 2004	-0.044	0.375*	-1.037*	0.123	-0.234**
	0.090	0.141	0.133	0.101	0.093
Constant	-0.702	-12.237*	12.872*	-2.648*	-0.824
	0.493	1.729	1.127	0.579	0.513
Number of obs.	30,394	30,394	30,394	30,394	30,394
R-squared	0.034	0.037	0.036	0.041	0.036
Adj. R-squared	0.034	0.037	0.035	0.041	0.036
F-value	F(10, 30383)				
	107.47	117.20	112.03	130.67	114.04
Prob. > F-value	0.000	0.000	0.000	0.000	0.000

Table VI.14 – Two-Stage Probit Least Squares Regressions (2SPLS) of LASAVI (cont'd)

Probit Model					
Explanatory Variables	**Compulsory**	**Voluntary**	**Both Comp. & Vol.**	**Green-card**	**No Health Insurance**
	Coefficient	*Coefficient*	*Coefficient*	*Coefficient*	*Coefficient*
	Std. Err.	*Std. Err.*	*Std. Err.*	*Std. Err.*	*Std. Err.*
LASAVI	0.131*	0.043	0.019	-0.145*	-0.109*
	0.012	0.029	0.024	0.019	0.014
Age	0.079*	0.043*	-0.023*	-0.015	-0.072*
	0.008	0.004	0.004	0.012	0.009
Age-squared	0.000*	-0.001*	0.000*	0.000	0.000*
	0.000	0.000	0.000	0.000	0.000
Female	0.052	-0.035	0.034	0.050	0.001
	0.033	0.079	0.079	0.060	0.039
Private Sector	-0.015	0.637*	-0.155***	0.318	0.885*
	0.064	0.246	0.089	0.289	0.218
SOEs	0.054	-	-0.304	0.550	0.717
	0.189	-	0.227	0.569	0.467
No Social Security	-2.554*	0.918*	-1.145*	1.748*	4.197*
	0.035	0.108	0.076	0.133	0.203
Disabled	-0.768*	0.070	-	1.085*	0.372***
	0.172	0.425	-	0.241	0.206
Seriously Ill	-1.215*	0.077	-	1.007*	0.882*
	0.085	0.207	-	0.121	0.097
Manager	0.006*	0.023	0.208***	-0.236**	-0.002
	0.066	0.174	0.124	0.108	0.078
Professional	0.262*	0.295***	0.153	-0.336**	-0.390*
	0.073	0.176	0.124	0.153	0.100
Sales Personal	0.181*	0.150	0.063	-0.165***	-0.024
	0.058	0.149	0.121	0.085	0.070
Farmer	0.361*	0.078	0.318	0.097	-0.289*
	0.110	0.185	0.259	0.122	0.102
Skilled Worker	0.017	0.112	0.007	-0.189*	0.198*
	0.051	0.124	0.111	0.067	0.056
Salary-Earner	1.401*	-1.511*	-0.024	-1.938*	-3.866*
	0.122	0.299	0.269	0.318	0.313
Wage-Earner	0.705*	-1.370*	0.651**	-1.733*	-3.792*
	0.118	0.286	0.277	0.315	0.311
Employer	0.625*	-1.699*	0.614**	-1.885*	-3.279*
	0.144	0.362	0.304	0.355	0.326
Self-employed	0.628*	-1.722*	0.889*	-1.533*	-3.478*
	0.134	0.331	0.292	0.331	0.320
Industry	0.546*	-0.130	0.066	0.348*	-0.542*
	0.110	0.186	0.256	0.123	0.104
Construction	0.240**	-0.194	0.138	0.429*	-0.396*
	0.109	0.183	0.255	0.117	0.099
Service	0.437*	-0.092	0.043	0.378*	-0.485*

Table VI.14 – Two-Stage Probit Least Squares Regressions (2SPLS) of LASAVI (cont'd)

	0.106	0.176	0.252	0.115	0.098
Rural	-0.280*	-0.001	-0.118**	0.040	0.341*
	0.027	0.066	0.054	0.047	0.033
Dummy 2004	-0.149*	0.291*	0.519*	0.265*	-0.218*
	0.024	0.052	0.042	0.038	0.029
Constant	-2.540*	-3.124	-2.176	-1.171*	2.052*
	0.176	.	.	0.264	0.201
Number of obs.	30,394	30,394	30,394	30,394	30,394
Pseudo R-squared	0.527	0.086	0.167	0.230	0.525
LR chi2 value	LR chi2(23)	LR chi2(22)	LR chi2(21)	LR chi2(23)	LR chi2(23)
	20,131.22	258.76	880.58	2,227.25	18,215.22
Prob. > chi2-value	0.000	0.000	0.000	0.000	0.000

*, ** and *** represent statistical significance levels of 1%, 5% and 10%, respectively.

The econometric results are in favour of the precautionary saving hypothesis. The empirical analysis reveals that the presence of health insurance coverage reduces the need for precautionary saving against the health expenditures risk, which is the possibility of out-of-pocket health expenditures. This econometric result is one of the important contributions of this empirical chapter to the literature on the precautionary saving hypothesis, since previous empirical studies including Starr-McCluer (1996) and Guariglia and Rossi (2004) found limited empirical support for this proposition. At the same time, the econometric results are parallel to the findings of Chou *et al.* (2003). It is observed that household saving level decreases, if the household head owns a green-card, which provides health insurance coverage for all family members.

The econometric results of the 2SPLS regression, which is presented with corrected standard errors in Table VI.15, for the second definition of household saving (*LASAVII*) are in accordance with the first regression. Once again, the dummy variables for having compulsory health insurance and having both compulsory and voluntary health insurance are positive and statistically significant in the household saving regression. Moreover, the dummy variables for having voluntary health

insurance including the purchases of private health insurance and green-card ownership are negative and statistically significant in the household saving regression. Finally, the dummy variable for household heads without any type of health insurance coverage is negative and statistically significant in the household saving regression.

Table VI.15 – Two-Stage Probit Least Squares Regressions (2SPLS) of LASAVII

OLS Regression					
Explanatory Variables	**Compulsory**	**Voluntary**	**Both Comp & Vol.**	**Green-card**	**No Health Insurance**
	Coefficient	*Coefficient*	*Coefficient*	*Coefficient*	*Coefficient*
	Std. Err.	*Std. Err.*	*Std. Err.*	*Std. Err.*	*Std. Err.*
Health Insurance	0.692*	-2.015*	1.770*	-1.150*	-0.478*
	0.037	0.252	0.120	0.088	0.028
Household Permanent Income	0.081*	0.079*	0.066*	0.084*	0.082*
	0.007	0.009	0.008	0.006	0.006
Real Estate	0.180*	0.246*	0.168*	0.170*	0.194*
	0.012	0.016	0.013	0.011	0.009
Nucleus Family	0.484	8.835*	-7.867*	0.312	0.436
	0.654	1.427	0.936	0.562	0.495
Traditional Family	1.367***	9.602*	-6.814*	1.060***	1.256**
	0.728	1.484	0.994	0.626	0.551
Single Parent Family	0.813	9.563*	-7.860*	0.820	0.816
	0.710	1.500	0.974	0.609	0.537
Children < 18	0.326	7.984*	-8.159*	0.086	-0.110
	0.636	1.409	0.918	0.544	0.481
Children > 18	-0.463	7.515*	-8.846*	-0.356	-0.617
	0.638	1.408	0.924	0.546	0.483
Rural	-0.107	-0.684*	-0.704*	-0.291*	-0.254*
	0.125	0.143	0.125	0.102	0.094
Dummy 2004	0.242**	0.716*	-0.783*	0.433*	0.019
	0.117	0.149	0.131	0.099	0.089
Constant	-0.179	-13.264*	13.835*	-2.396*	-0.313
	0.646	1.911	1.118	0.575	0.489
Number of obs.	30,394	30,394	30,394	30,394	30,394
R-squared	0.046	0.049	0.043	0.055	0.049
Adj. R-squared	0.046	0.048	0.042	0.055	0.048
F-value	F(10, 30383)				
	145.94	155.45	135.15	177.27	154.80
Prob. > F-value	0.000	0.000	0.000	0.000	0.000

Table VI.15 – Two-Stage Probit Least Squares Regressions (2SPLS) of LASAVII (cont'd)

Probit Model					
Explanatory Variables	**Compulsory**	**Voluntary**	**Both Comp. & Vol.**	**Green-card**	**No Health Insurance**
	Coefficient	*Coefficient*	*Coefficient*	*Coefficient*	*Coefficient*
	Std. Err.	*Std. Err.*	*Std. Err.*	*Std. Err.*	*Std. Err.*
LASAVII	0.124*	0.036	0.018	-0.134*	-0.104*
	0.019	0.026	0.021	0.017	0.012
Age	0.074*	0.041*	-0.024*	-0.010	-0.068*
	0.014	0.004	0.004	0.012	0.009
Age-squared	0.000	0.000*	0.000*	0.000	0.000**
	0.000	0.000	0.000	0.000	0.000
Female	0.066	-0.030	0.036	0.036	-0.011
	0.067	0.079	0.079	0.059	0.038
Private Sector	-0.006	0.633*	-0.153***	0.308	0.874*
	0.088	0.246	0.089	0.289	0.218
SOEs	0.074	-	-0.301	0.520	0.701
	0.225	-	0.226	0.568	0.467
No Social Security	-2.559*	0.911*	-1.145*	1.757*	4.199*
	0.059	0.107	0.075	0.133	0.203
Disabled	-0.776***	0.062	-	1.098*	0.378***
	0.398	0.424	-	0.231	0.200
Seriously Ill	-1.165*	0.088	-	0.956*	0.839*
	0.189	0.208	-	0.117	0.095
Manager	0.002	0.033	0.206***	-0.238**	0.004
	0.109	0.173	0.123	0.106	0.077
Professional	0.219**	0.292	0.146	-0.294***	-0.351*
	0.112	0.179	0.126	0.154	0.100
Sales Personal	0.162***	0.147	0.060	-0.147***	-0.007
	0.093	0.150	0.122	0.085	0.069
Farmer	0.325***	0.064	0.313	0.140	-0.258*
	0.173	0.183	0.259	0.118	0.100
Skilled Worker	0.020	0.119	0.008	-0.196*	0.197*
	0.082	0.123	0.111	0.065	0.055
Salary-Earner	1.431*	-1.491*	-0.021	-1.975*	-3.888*
	0.186	0.297	0.268	0.316	0.312
Wage-Earner	0.759*	-1.349*	0.658**	-1.792*	-3.835*
	0.181	0.285	0.276	0.314	0.310
Employer	0.671*	-1.661*	0.618**	-1.949*	-3.312*
	0.226	0.356	0.300	0.350	0.324
Self-employed	0.698*	-1.682*	0.897*	-1.620*	-3.532*
	0.207	0.324	0.288	0.327	0.318
Industry	0.505*	-0.146	0.060	0.394*	-0.509*
	0.171	0.185	0.255	0.120	0.102
Construction	0.204	-0.208	0.132	0.470*	-0.367*
	0.170	0.182	0.255	0.114	0.097
Service	0.407**	-0.105	0.039	0.413*	-0.461*

Table VI.15 – Two-Stage Probit Least Squares Regressions (2SPLS) of LASAVII (cont'd)

	0.165	0.175	0.251	0.112	0.096
Rural	-0.280*	-0.001	-0.118**	0.041	0.341*
	0.049	0.066	0.054	0.046	0.032
Dummy 2004	-0.182*	0.281*	0.514*	0.301*	-0.191*
	0.042	0.052	0.042	0.037	0.028
Constant	-2.523*	-3.117	-2.173	-1.181*	2.038*
	0.300	.	.	0.260	0.198
Number of obs.	30,394	30,394	30,394	30,394	30,394
Pseudo R-squared	0.528	0.086	0.167	0.525	0.230
LR chi2 value	LR chi2(23)	LR chi2(22)	LR chi2(21)	LR chi2(23)	LR chi2(23)
	20,143.16	258.43	880.68	18,223.51	2,231.03
Prob. > chi2-value	0.000	0.000	0.000	0.000	0.000

*, ** and *** represent statistical significance levels of 1%, 5% and 10%, respectively.

VI.3.C – Discussion

There are two main issues, which affect the validity of the empirical analysis and require further discussion about health expenditures risk. The first issue is the difficulty to control for the degree of risk-aversion of the individuals in the empirical analysis. It is thought that more risk-averse individuals are more likely to purchase private health insurance to insure themselves against health expenditures risk compared to the rest of society. At the same time, there is an important connection between the choice of occupation and health insurance coverage. It is reasonable to assume that for a more risk-averse individual to occupy a position in the public sector has greater benefits, because being a civil servant does not only reduce the possibility of job-loss, but it also provides a reliable guarantee against health expenditures risk.

The second issue is the distortion effects, which are created by an unequal income distribution on household consumption and saving behaviour. The effect of an unequal income distribution can be seen in many aspects of social life in Turkey.

However, it creates its most significant mark on human capital development such as health and education of young individuals. It is thought that households from the middle and upper classes of society are more likely to purchase private health insurance, since wealthy individuals can afford to pay high premiums unlike poor households. Hence, it is reasonable to observe that wealthy households invest in private health insurance against health expenditures risk, even though their household saving level is already significantly positive. Hubbard *et al.* (1995) discussed similar arguments previously for low-income households in the U.S. society.

Moreover, it is observed that the proportion of individuals with health insurance coverage increases with the level of education. It is found that a higher education level raises the permanent income level of the individuals, which indirectly influences their consumption and saving decisions. At the same time, higher education level might increase the awareness of the individual and the importance given to health issues, especially among young adults and for their children. Hence, the level of education emerges as the main determinant of social and economic life in Turkey. The empirical analysis clearly indicates that a comprehensive education reform should follow the social security reform to deal with the structural economic and social problems of the country such as the low level of female labour force participation rate.

For instance, the only way a disabled individual will acquire a good job with a satisfactory pay is that if the individual is well educated, then he/she can perform a desk-job and enjoy social security coverage as part his/her employment contract. In this respect, education emerges as one of the most important factors in the well being of an individual. In particular, it is necessary to eliminate the barriers that prohibit the

disabled individuals from receiving a good level of education and participating in the labour market.

VI.4 – Conclusion

The empirical analysis in this chapter provides support in favour of the precautionary saving hypothesis. It is observed that there is a negative relationship between household saving and the purchase of private health insurance in line with the premises of the precautionary saving hypothesis. The purchase of private health insurance diminishes the importance of health expenditures risk for households, which is the possibility of out-of-pocket health expenditures. Therefore, households decrease their saving level in response to the fall in risk.

However, the empirical analysis suggests the importance of the public health care system for the low-income families in society. It is observed that these poor and unemployed individuals and their families' constitute the most vulnerable group in society to health expenditures risk. Families that belong to this group are completely dependant on free public health care services, if their household saving level is low or negative. Therefore, the empirical analysis underlines the need for a social security reform and the significance of the introduction of universal health care system in Turkey.

On the other hand, it is observed from the TURKSTAT Household Budget Surveys that the purchases of private health insurance are limited in Turkey. Health expenditures are mainly financed by the social security institutions, which accumulate a significant amount in the centralised public sector budget in the recent years. Thus,

it is necessary to support the policy implications of private insurance schemes in a developing country from the perspective of the social security system.

- The rise in the purchases of private health insurance will increase the household saving rate and decrease the pressure on the public finances.
- This positive development will contribute to the expansion of the financial markets.

This private policy initiative in the insurance market can be considered as a complementary approach to the social security system, which is governed by the state. This dual approach might provide a long-term vision for social security policy in a developing country, which needs a higher saving level to finance private investment, and also improve the lives of households. Moreover, it is observed that the individual pension system, which is quite similar to the private health insurance, is developing significantly in time in Turkey. It is thought that the rise in private pension funds will also add to the rise in household saving.

However, there are limits to the private health insurance framework. A private insurance company is less likely to provide health insurance for someone, who is already seriously ill, *i.e.* heart condition, or disabled individuals. It is difficult for these individuals to secure employment, which requires physical work and thus, gain social security coverage, which also includes the financing of health expenditures. Disabled individuals are dependant on the support of their families and charities without the aid of the welfare state. They are one of the most vulnerable segments of society and they will significantly benefit from the introduction of universal health care system in Turkey.

Chapter VII

Conclusion

VII.1 – Introduction

The precautionary saving hypothesis is line with the fundamental premises of Modern Consumer Theory, which was developed with the pioneering contributions of Modigliani and Brumberg (1954) and Friedman (1957). The role of the precautionary saving hypothesis in a critical discussion of Modern Consumer Theory is to introduce the elements of risk and uncertainty into the analysis of household consumption and saving behaviour. The aim of this discussion is to understand Modern Consumer Theory more fully with a more realistic approach to understand all the motives behind household saving decisions. Therefore, this Ph.D. thesis makes a significant contribution to the analysis of household consumption and saving behaviour for three main reasons:

I. First, the thesis presents a thorough empirical analysis of household behaviour using cross-sectional data from a developing country. The empirical analysis is not simply restricted to the individuals' economic decisions, but also covers social and demographic aspects of family life comprehensively.

II. The empirical analysis establishes a strong and positive relationship between household saving decisions and labour income risk. Moreover, it is observed that the share of precautionary saving in total household saving reaches significant levels depending on the definition of household saving.

III. Second, the significance of the precautionary motive for saving in household saving decisions is highlighted by this empirical study. The presence of risk and uncertainty influences household consumption and saving behaviour. At the same time, it is shown that there are different sources of risk and uncertainty in the economy such as business income risk and health expenditures risk.

The empirical analysis reveals how important the influence of different types and definitions of risk categories are in the daily lives of households in Turkey. It is observed in each of the empirical chapters that all risk variables have a positive and statistically significant effect on household saving decisions. In particular, households postpone their consumption expenditures and raise their saving level against labour income risk and health expenditures risk. In this respect, the empirical analysis is strongly in favour of the precautionary saving hypothesis. The share of precautionary saving in total household saving is significant, especially in the case of labour income risk due its relevance to the current situation of the Turkish economy.

Moreover, there are two important issues that I would like to mention in the conclusion. The first issue is the ongoing reform process in the social security system in Turkey. The impact of different types and definitions of risk such as health expenditures risk on household saving decisions is a contemporary issue. The reform process in the social security system starts with the improvement of the public health care system.

The second issue is the technical problems, which surfaced during empirical research due to the structural limitations of the household budget surveys, which are prepared by the Institute of Statistics of the Republic of Turkey (TURKSTAT). The TURKSTAT Household Budget Surveys for 2003 and 2004, which is a stable and positive period of the Turkish economy, provide reliable information at the individual and household level. However, it is thought that empirical research could be improved further in the future with a more comprehensive and longer panel-data set.

It is possible to group these problems under three separate categories:

i) The disturbing impact of a high and chronic inflation period on household finances limits the comparison between previous household budget surveys, since this particular problem was not eradicated in the preparation of the surveys.

ii) As a consequence of the first category (i), the time dimension of the utilised household budget surveys is narrow, which makes the use of advanced econometrics techniques unfeasible in the empirical analysis.

iii) The household budget surveys are designed as repeated cross-sectional surveys, which show differences in their sample sizes. Therefore, the surveys lack a panel dimension, which restricts the scope of empirical research.

As a result of the limitations posed by the household budget surveys, more interesting research questions simply could not emerge. Therefore, a more detailed approach to the precautionary saving hypothesis was not possible. Although, there is significant empirical evidence in favour of the precautionary saving hypothesis, the empirical analysis could be extended to gain more information about the attitude of

households towards risk. For instance, households' degree of prudence could not be estimated without the availability of a genuine panel data set at the household level, which was previously performed by Dynan (1993).

VII.2 – Discussion

The most important contribution of this Ph.D. thesis to the analysis of household consumption and saving behaviour is the confirmation that labour income risk is a particularly significant concept within the context of developing countries. It is observed that precautionary saving occupies an important share of total household saving in Turkey. It is thought that households from developing countries are more vulnerable to different types and definitions of risk in their daily lives, since the social security system is not sufficient to meet the needs and the demands of society.

Moreover, the introduction of business income risk as a unique concept is an important contribution of this Ph.D. thesis. The analysis of business income risk is a particularly new and promising field, which has limited theoretical background and has not been investigated in the empirical literature previously. The empirical analysis reveals that business income risk is a significant determinant of household saving decisions of entrepreneurs.

Among the different types and definitions of risk that are investigated in this Ph.D. thesis, the empirical importance of labour income risk surpasses the remaining categories and especially, health expenditures risk for various reasons:

- A spell of unemployment does not only lead to the loss of labour income, but it also leaves the individual completely exposed to out-of-pocket health expenditures, if the individual does not own private health insurance.
- A job opportunity provides guarantees the well-being of the individual both during the working-years and the retirement period due to the social security coverage in the registered economy.
- The choice of occupation, the purchase of private health insurance and the accumulation of precautionary saving are interrelated decisions, especially for more risk-averse individuals.
- Education is the most important characteristic, since it plays a direct role on labour force participation rates, the formation of disposable income and household saving decisions.

VII.3 – Directions for Further Research

It will be interesting to analyse household consumption and saving behaviour once the reform process in the social security system is completed in Turkey. An important question is the future direction of household saving with the completion of the social security reform. In particular, its influence on saving decisions of families, who are dependent on free public health services, is a promising topic, especially after the introduction of a universal health care system.

It is thought that the introduction of a universal health care system will reduce the amount of precautionary saving to be protected against health expenditures risk, as it was observed previously in other developing countries, which experienced similar

structural changes. The transformation of the economy will diminish the importance of the health expenditures risk, since households will not be exposed to out-of-pocket health expenditures anymore, especially for their young children. Thus, it is expected that the share of precautionary saving in total household saving will decline in the future as a result of the improvement of the social security system in Turkey.

APPENDIX

The aim of this section is to provide a brief explanation for the main economic variables used in the econometric investigation process. The definitions of the main economic variables are presented in Table.A1. All the economic variables represent annual figures. The definitions and interpretations of all the economic variables are exactly the same for all waves of the TURKSTAT Household Budget Surveys.

Table.A1 – The Definitions of the Main Economics Variables

Household Consumption	Annual household consumption expenditures variable is not available in the TURKSTAT Household Budget Surveys.
- including expenditures on durable goods	*Monthly household consumption expenditures are annualised in order to reach a year estimate of household consumption expenditures.*
- excluding expenditures on durable goods	*Expenditures on durables are subtracted from total monthly household consumption expenditures. The remaining expenditures are also annualised to reach a year estimate of household consumption expenditures.*
Household Disposable Income	Annual household disposable income variable is available in the TURKSTAT Household Budget Surveys. It is the sum of individual disposable income of all family members from all sources.
Household Saving	Annual household saving is calculated as the difference between household disposable income and household consumption expenditures.
- SAVI (*excluding expenditures on durable good*)	*Annual estimate of household consumption expenditures (including expenditures on durable goods) is subtracted from household disposable income.*
- SAVII (*including expenditures on durable goods*)	*Annual estimate of household consumption expenditures (excluding expenditures on durable goods) is subtracted from household disposable income.*
Individual Labour Income	Individual labour income only consists of wage and salary earnings. It also includes premiums and income-in-kind, which are parts of the employment contract. Only observations that belong to the household heads are selected from the sample set and used in the regression analysis.

Table.A1 – The Definitions of the Main Economics Variables (cont'd)

Individual Permanent Income	Individual permanent income is estimated using a Heckman two-step selection model. The first stage of the model is a probit model and the dependent variable is a dummy variable, which equals one if the individual has positive income. In the second stage of the model, the logarithmic values of individual disposable income are regressed on the dummy variables for social, economic and demographic characteristics of the individual. The predicted values from the second stage of the model are saved and used as a proxy variable for the permanent component of individual disposable income.

The definitions of the dummy variables are presented in Table.A2 and the definitions and the interpretations of all of the dummy variables are the same for all waves of the TURKSTAT Household Budget Surveys.

Table.A2 – The Definitions of the Dummy Variables across Categories

Education Level	
Illiterate	An individual, who does not know how to read and write.
Literate	An individual, who knows how to read and write, but does not have a Primary School degree.
Primary School	Primary School Graduates
Secondary School	Secondary School Graduates
High School	High School Graduates.
University Graduate	2-years Technical School Graduates and University Graduates.
Post-Graduate	Masters Degree and/or Ph.D. Degree.
Employment Sector	
Agriculture	Agriculture, Hunting, Fishing and Forestry.
Industry	Mining, Manufacturing and Energy.
Construction	Construction.
Services	Tourism, Financial Services, Transportation etc…
Occupation	
Manager	Lawmakers, Managers etc…
Professional	Lawyers, Doctors, Veterinarians etc…
Sales Person	Sales and Consumer Services.
Farmer	Skill-full workers in the agricultural sector.
Skilled Worker	Artisans and/or Operators in the industrial sector.
Unskilled Worker	Individuals that work in jobs, which do not require any skills.

Table.A2 – The Definitions of the Dummy Variables across Categories (cont'd)

Employment Status	
Salary Earner	An individual, who works in a business establishment based on an employment contract, and earns a periodic income from this job.
Wage Earner	An individual, who works in a business establishment either seasonally or temporarily without any employment contract.
Apprentice	An individual that works in a business establishment to gain skills and job-experience.
Self-Employed	An individual, who is working in his/her own business establishment with or without partners, to earn income or income-in-kind.
Employer	An individual that employs at least one person in his/her own business establishment.
Unpaid Family Worker	An individual, who works in a business establishment owned by a family member or by someone from the same household, but is not paid for his/her work.
Family Types	
Nuclear Family	It is a modern type of family, which is composed of only two parents and children.
Extended Family	It is a traditional type of family, where the parents and children live together with grandparents and other relatives.
Single Parent Family	There is only one parent in the family living with children.
Children > 18	At least one child in the family is older than 18 years of age.
Children < 18	At least one child in the family is smaller than 18 years of age.
Social Security	
SSK	The individual is registered to the Social Security Institution
ES	The individual is registered to the Retirement Fund.
BK	The individual is registered to the Fund.
PF	The individual is registered to a private retirement fund.
Without Social Security	The individual does not have any social security coverage.
Health Insurance	
Compulsory Insurance	The individual has health insurance due to his/her job.
Voluntary Insurance	The individual has private health insurance.
Both Comp. & Vol. Ins.	The individual has both types of health insurance at the same time.
Green Card	The individual benefits public health services for free.
Without Health Insurance	The individual does not have a health insurance.

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